THE DECAPODA OF THE SIBOGA-EXPEDITION

PART VI

THE AXIIDAE COLLECTED BY THE SIBOGA-EXPEDITION

LIBRARY
FISH & WILDLIFE SERVICE
PACIFIC OCEANIC FISHERY
INVESTIGATIONS

Siboga-Expeditie
XXXIXa[5]

THE

DECAPODA OF THE SIBOGA-EXPEDITION

PART VI

THE AXIIDAE COLLECTED BY THE SIBOGA-EXPEDITION

BY

Dr. J. G. DE MAN
Ierseke (Holland)

With 10 plates

LATE E. J. BRILL
PUBLISHERS AND PRINTERS
LEIDEN — 1925

TO THE MEMORY

OF HIS HIGHLY ESTEEMED AND BELOVED PARENTS

THIS WORK IS DEDICATED

BY

THE AUTHOR

THE AXIIDAE COLLECTED BY THE SIBOGA-EXPEDITION

BY

Dr. J. G. DE MAN,

Ierseke (Holland)

With 10 plates.

INTRODUCTION.

The species of Axiidae collected by this Expedition were already described by the author in 1905, excepting *Axius (Eiconaxius) Sibogae* de Man, *Axiopsis (Axiopsis) pailoloensis* (Rathb.) and *Axiopsis (Axiopsis) spinosissima* (Rathb.), that have been described in the course of 1925. Diagnoses of the new genera and species were already published in 1905 and in 1907. A diagnosis of *Axius (Eiconaxius) Sibogae* was published in January 1925 and as regards *Calocaris (Calastacus) Sibogae*, this species was also already described in 1905 under the name of *Calocaris (Calastacus) felix* Alcock & Anderson, but it is only quite recently that it was considered by the author to be a new species. Owing to various circumstances the publication of this work has so long been delayed. The descriptions, however, have now been put by the author up to date; the List of all the species of *Axiidae*, known at present, like also the Keys for determining them, were likewise composed in the course of 1925.

The figures of the ten Plates have all been drawn by the author.

LIST OF SPECIES.

Axius (? Axius) odontorhynchus de Man.
Axius (Neaxius) euryrhynchus de Man.
Axius (Eiconaxius) crista-galli Faxon var. *indica* de Man.
Axius (Eiconaxius) Sibogae de Man.
Axius (Eiconaxius) acutifrons (Bate).
Axius (Eiconaxius) consobrinus (de Man).
Axius (Eiconaxius) parvus (Bate).
Axius (Eiconaxius) Weberi (de Man).
Scytoleptus serripes Gerst.
Meticonaxius monodon de Man.
Anophthalmaxius eccoptodactylus de Man.
Axiopsis (Axiopsis) serratifrons (A. M.-Edw.).
Axiopsis (Axiopsis) consobrina de Man.
Axiopsis (Axiopsis) tenuicornis de Man.
Axiopsis (Axiopsis) pailoloensis (Rathb.).
Axiopsis (Axiopsis) Picteti (Zehntner).
Axiopsis (Axiopsis) Picteti (Zehnter) var. *spinimana* de Man.
Axiopsis (Axiopsis) spinosissima (Rathb.).
Axiopsis (Paraxiopsis) Brockii (de Man).
Axiopsis (Paraxiopsis) bisquamosa de Man.
Calocaris (Calastacus) euophthalma de Man.
Calocaris (Calastacus) Sibogae de Man.

Family AXIIDAE.

The Family Axiidae contains at present the following 8 genera: *Axius* Leach, subdivided into 5 subgenera *Axius* s. s., *Neaxius* Borr., *Eiconaxius* Bate, *Iconaxiopsis* Alcock and *Paraxius* Bate; *Scytoleptus* Gerst.; *Meticonaxius* de Man; *Anophthalmaxius* de Man; *Axiopsis* Borr. with 3 subgenera *Axiopsis* s. s., *Calocarides* Wollebaek, and *Paraxiopsis* de Man; *Oxyrhynchaxius* Parisi; *Calocaris* Bell with 2 subgenera *Calocaris* s. s. and *Calastacus* Faxon and, finally, *Metaxius* Bouv. *Scytoleptus* Gerst., *Meticonaxius* de Man, *Anophthalmaxius* de Man and *Oxyrhynchaxius* Parisi are confined to the Indopacific, *Metaxius* Bouv. is only known from the West Indies, while *Axius* Leach, *Axiopsis* Borr. and *Calocaris* Bell are represented both in the Indopacific and the Atlantic regions.

Key[1]) to the known Genera and Subgenera of the Family *Axiidae*.

a_1 No suture on the exopod of the last limb.
  b_1 Eyepeduncles of the ordinary form, cylindrical or conical, sometimes subsessile, rarely unrecognizable.
    c_1 Propodi of 3rd and 4th peraeopods of the ordinary form, longer than the carpus.
      d_1 Back not falling steeply to rostrum. Antennal thorns present. — *Axius* Leach
        e_1 Flat area of back and cervical groove well marked. Antennal thorns large.
          f_1 Pleurobranchs on legs 2—4. Rostrum triangular, pointed, margins dentate . . . . . — Subgenus *Axius* s. s.
          f_2 Pleurobranchs wanting. Rostrum notched or emarginate anteriorly in the middle line; margins dentate. — Subgenus *Neaxius* Borr.
        e_2 Flat area of back and cervical groove more or less indistinct.
          g_1 Pleurobranchs on legs 2—4. Antennal thorns large. — Subgenera *Eiconaxius* Bate and *Iconaxiopsis* Alcock
          g_2 No pleurobranchs. Antennal thorns both very small. — Subgenus *Paraxius* Bate.
      d_2 Back falling steeply to rostrum. Antennal thorns wanting. — *Scytoleptus* Gerst.

1) This key is chiefly taken from Mr. L. A. BORRADAILE's useful and practical paper: "On the Classification of the Thalassinidea (Annals and Magazine of Natural History, Ser. 7, Vol. XII, November 1903)".

c_2 Propodi of 3rd and 4th peraeopods compressed, oval, fringed with hairs, much wider and shorter than the carpus. Rostrum triangular, carinate in the middle line, continuous with the gastric region and with its margins unarmed . *Meticonaxius* de Man

b_2 Instead of the eyepeduncles two quadrangular plates that are probably coalesced, not only with one another in the middle line, but also with the basal joints of the antennular peduncles. No trace of eyes at all. Gastric region not falling steeply to rostrum. Antennal thorns of good size. . . . . *Anophthalmaxius* de Man

a_2 A suture on the exopod of the last limb.

h_1 Back flat. Hinder part of the carapace rounded, not carinate [1]) . . . . . *Axiopsis* Borr.

i_1 Rostrum continuous with the gastric region. Antennal thorns large.

j_1 Eyes pigmented. . . . . Subgenus *Axiopsis* s. s.

j_2 Eyes pale . . . . . Subgenus *Calocarides* Wollebaek

i_2 Rostrum not continuous with the gastric region, the carapace sloping anteriorly down to the rostrum. Antennal thorns very small . . . . . Subgenus *Paraxiopsis* de Man

h_2 Back flat. A keel runs the whole length of the carapace in the middle line. Eyepeduncles very long, eyes devoid of pigment, pale. Antennal thorns large . . . *Oxyrhynchaxius* Parisi [2])

(B. PARISI, in: Atti della Società Italiana di Scienze Naturali. Vol. LVI, Pavia 1917, p. 17).

h_3 Back arched or flat. A keel runs the whole length of the carapace in the middle line or is at least distinct on the gastric region and at the posterior border [3]). . . *Calocaris* Bell.

k_1 Antennal thorns small. Back arched. Eyes large, flattened, short, without pigment . . Subgenus *Calocaris* s. s.

k_2 Antennal thorns large. Back more or less arched or flattened. Eyes rudimentary, subglobose, devoid of pigment and corneal facets, often fixed or there are movable eyepeduncles with well developed facets and pigment . . . . . Subgenus *Calastacus* Faxon

The genus *Metaxius* Bouv. (E. L. BOUVIER, Compt. Rend. Acad. Sc. Paris, T. 141, Paris 1905, p. 802—806) could not be inserted in this key, because the original description is

1) Excepting *Axiopsis Habereri* (Balss), in which the carina between the cervical groove and the posterior border of the carapace is distinctly developed.

2) The genus *Oxyrhynchaxius* Parisi should in my opinion be identified with the subgenus *Calastacus* Faxon, of which it shows indeed all the characters. The dorsal carapacial carina is as distinct as in *Calocaris (Calastacus) Investigatoris* Anderson, while the only known species, *Oxyrh. japonicus*, much agrees with *Calocaris (Calastacus) quinqueseriata* Rathb. as regards the armature of the rostrum and of the gastric region. The extraordinary length of the eyepeduncles, the eyes of which are devoid of pigment, cannot be considered as a character of generic value.

3) In *Calocaris aberrans* Bouv. no carina does exist on the hinder part of the carapace behind the cervical groove.

too brief and insufficient. The following characters are only known. Propodus of external maxillipeds appearing as a broad, dilated lamina, dactylus short and narrow. Eyepeduncles conical, eyes small, terminal, black pigmented. Rostrum triangular, pointed, with a median dorsal carina. Fingers of the left leg of first pair unarmed, crossing one another and shorter than the palm, abdominal pleura obtuse. Telson as broad as long. Deep-water habitat.

LIST OF ALL THE SPECIES OF AXIIDAE, KNOWN AT PRESENT.

JULY 1925 [1]).

I. Genus **Axius** Leach 1815.

Subgenus **Axius** s. s.

SPECIES	HABITAT	DEPTH IN FATHOMS
armatus S. J. Smith 1881. . . .	Off the south coast of New England: Lat. 39° 46′ to 40° 06′ N., Long. 70° 22′ to 71° 10′ W.	100, 142
novae-zealandiae Borr. 1916. . .	7 miles E. of North Cape, New Zealand	70
*odontorhynchus de Man 1905 .	West coast of Great Kei Island, Lat. 5° 36′.5 S., long. 132° 55′.2 E.	50
	South coast of Timor, Lat. 10° 12′.2 S., long. 124° 27′.3 E.	40
serratus Stimps. 1852	In the stomach of a flounder (*Glyptocephalus cynoglossus*) taken about five miles southeast from Cape Ann (Mass.)	42
	Off Scituate (Mass.)	20
	George's Banks (Mass.)	
	Narragansett Bay (R. I.)	20
	Off Stratford Point and Norwalk (Conn.)	10—15
stirhynchus Leach 1815.	South coast of England (Cornwall, Falmouth in stomachs of various fish, at low water at Helford and Pendennis in sand; Polperro; Plymouth; Sidmouth). Seaford, Sussex. Irish Sea and west coast of Ireland. Channel Islands. Coasts of France, Roscoff. Mediterranean, Marseille, Gulf of Naples.	Littoral, of burrowing habits

Subgenus **Neaxius** Borr. 1903.

acanthus A. M.-Edw. 1878 . . .	New Caledonia	
	Talili Bay and Ralum, New Britain	
	West Celebes	
acanthus A. M.-Edw. 1878 var. *mauritiana* Bouv. 1914. . . .	Mauritius (Port-Louis, Le Chaland)	
*euryrhynchus de Man 1905 . .	Anchorage of Dongala, Palos-bay, Celebes	20

1) The species collected by the "Siboga" are marked with an asterisk and the new species are printed in a more heavy type.

SPECIES	HABITAT	DEPTH IN FATHOMS
glyptocercus von Martens 1868.	Cape York	
Gundlachi (von Martens) 1872.	Cuba	
	Curaçao (Harbor of Willemstad, Schottegat (lagoon))	1 fathom
Gundlachi (von Martens) 1872 var. *orientalis* de Man 1925.	Matupi (New Pommerania)	
laevis Bouv. 1915	South of the Canaries	
	Lat. N. 25° 29′, Long. W. 18° 18′	381
plectrorhynchus Strahl 1862 . .	Luzon. Amboina	
	Port Molle, east coast of Queensland	Between tide marks
	Beaumaris, Victoria	3 to 4 fathoms, below tide mark
Vivesi (Bouv.) 1895	Lower California	

Subgenus **Eiconaxius** Bate 1888 (inclusive **Iconaxiopsis** Alcock 1901).

**acutifrons* (Bate) 1888.	Off Banda	360
	Off South point of Great-Kei-Island, Lat. 5° 56′.5 S., long. 132° 47′.7 E.	325
	South of Panama	465, 555
Agassizi Bouv. 1905.	West Indies, Gulf of Mexico	
andamanensis (Alcock) 1901 . .	Off the west coast of the Andamans	238—290
asper (Rathb.) 1906	Off Kauai Island, Hawaiian Islands	418 to 528
Borradailei Bouv. 1905	West Indies, Gulf of Mexico	
caribbaeus (Faxon) 1896.	Off Guadeloupe	150
	Off St. Vincent	88
	Off Grenadines	163
	Off Barbados	237
communis Bouv. 1905	West Indies, Gulf of Mexico	
***consobrinus** (de Man) 1907. . .	Between the east point of Timor and the island of Letti, Lat. 8° 17′.4 S., long. 127° 30′.7 E.	669
crista-galli Faxon 1893.	South of Panama	465
crista-galli Faxon var. *antillensis* Bouv. 1905.	Antilles	
crista-galli* Faxon var. **indica de Man 1907	Off the south-east coast of Great-Kei-Island, Lat. 5° 54′ S., long. 132° 56′.7 E.	537
farreae (Ortm.) 1891	Sagami-bay, Japan	100—200
	Uraga Channel	327
	Tokio-bay	327
kermadecensis (Chilton) 1911 . .	Kermadec Islands	
kermadeci (Bate) 1888.	North of the Kermadec Islands	600
laccadivensis (Alcock) 1901. . .	Arabian Sea, near the Laccadives and off the Travancore Coast	360, 430, 705
**parvus* (Bate).	Off the Kermadec Islands	520
	Off the Southwest coast of Great-Kei-Island, Lat. 5° 53′.8 S., long. 132° 48′.8 E.	306
rotundifrons Bouv. 1905	West Indies and Gulf of Mexico	
***Sibogae** de Man 1925.	Sulu-Sea, Lat. 5° 43′.5 N., long. 119° 40′ E.	285
spiniger (Mac Gilchrist) 1905 . .	Bay of Bengal	

SPECIES	HABITAT	DEPTH IN FATHOMS
*Weberi (de Man) 1907	Off the south-east and south-west coast of Great-Kei-Island, Lat. 5° 56′.5 S., long. 132° 47′.7 E. and Lat. 5° 54′ S., long. 132° 56′7 E.	325, 538
	Subgenus **Paraxius** Bate 1888.	
altus (Bate) 1888.	North of New Guinea	1070
tridens (Rathb.) 1906	French Frigate Shoal, Hawaiian Islands	17 to 17½
	Off Modu Manu, Hawaiian Islands	20 to 33
	Makatea, Paumotu Islands	

To the genus *Axius* Leach apparently also belongs *Axius nodulosus* Meinert 1877, from Nymindegab, West coast of Jutland; this species, however, is so imperfectly known, that it is uncertain to which subgenus it should be referred.

II. Genus **Scytoleptus** Gerst. 1856.

**serripes* Gerst. 1856.	South Africa, probably Port Natal	
	Moçambique. Madagascar	
	Aldabra. Mauritius	
	Luzon	
	Off Seba, Island of Savu	15. Reef
	Pulu Pasi Tanette, near the northpoint of Saleyer-island	20. Reef
tricarinatus (Kingsley) 1882 . .	Zanzibar	

III. Genus **Meticonaxius** de Man 1905.

*monodon de Man 1905.	Lat. 7° 46′ S., long. 114° 30′.5 E.	180
? *longispina* (Stebbing) 1920. . .	Cape Morgan, South Africa, N.N.W. 7 miles	52

IV. Genus **Anophthalmaxius** de Man 1905.

*eccoptodactylus de Man 1905.	Off the west coast of the Aru Islands, Lat. 5° 46′.7 S., long 134° 0′ E.	977

V. Genus **Axiopsis** Borr. 1903.

Subgenus **Axiopsis** s. s.

australiensis de Man 1925 . . .	Port Jackson (Australia)	
clypeata (de Man) 1888	Amboina	
*consobrina de Man 1905. . . .	Sulu Sea, Lat. 6° 8′ N., long. 121° 19′ E.	150
	Between islands of Wowoni and Buton, Lat. 4° 20′ S., long. 122° 58′. E.	41 to 51
	Mid-channel in Solor-strait off Kampong Menanga	62
Habereri (Balss) 1913.	Fukuura, Sagami Bay	

SPECIES	HABITAT	DEPTH IN FATHOMS
inaequalis (Rathb.) 1901.	Porto Rico	161 to 172
longipes Bouv. 1905	Barbados	109
mediterranea Caroli 1921	Naples	In shallow water
**pailoloensis* (Rathb.) 1906	Pailolo channel, Hawaiian Islands	138 to 140
	Between Islands of Wowoni and Buton, Lat. 4° 20′ S., long 122° 58′ E.	41 to 51
**Picteti* (Zehntner) 1894	Amboina	
	Off the South point of Kabaëna-island	Reef
Picteti* (Zehntner) var. **spinimana de Man 1905	Off the South point of Kabaëna-island	Reef
	Tiop, Bougainville (German New Guinea)	
pitatucensis de Man 1925	Pitatuki on the island of Buka (German New Guinea)	
princeps (Boas) 1880	Wladiwostock	
rudis (Rathb.) 1906	South coast of Molokai Island, Hawaiian Islands	92 to 212
	Vicinity of Kauai Island, Hawaiian Islands	233 to 40
**serratifrons* (A. M.-Edw.) 1873	Hawaiian Islands. Fanning Island	
	Upolu, Samoa Islands	
	Jaluit, Marshall Islands. Angaur, Palau Islands	
	Java Sea. Amboina	Reef
	Coast of Obi Major. North of Salomakiëe-(Damar) Island	Reef
	Saleyer-Anchorage and Surroundings	Reef
	South-Lucipara-island	Reef
	Off Rumah Lusi, Northpoint of Tiur-island	Reef
	Kur-island	Reef
	Pepela-bay, east coast of Rotti-island	Reef
	Hulule, Male Atoll, Maldives	Between tide marks
	Salomon Atoll, Chagos Archipelago	
	Obock. Red Sea	
**spinosissima* (Rathb.) 1906 . . .	South coast of Molokai Island, Hawaiian Islands	23 to 24
	Between islands of Wowoni and Buton, Lat. 4° 20′ S., long. 122° 58′ E.	41 to 51
spinulicauda (Rathb.) 1902 . . .	Off Bodega Head, California	62
***tenuicornis** de Man 1905. . . .	Lat. 7° 46′ S., long. 114° 30′.5 E.	180
	Subgenus **Calocarides** Wollebaek 1908.	
coronata (Trybom) 1904.	Kosterfjord (Bohuslån)	126
	Skager Rack	224, 273
crassipes (Trybom) 1904.	Kosterfjord (Bohuslån)	120
	Hjoerund Fjord near Aalesund	232
	Byfjord near Bergen	220
	Subgenus **Paraxiopsis** de Man 1905.	
aethiopica Nobili 1904	Red Sea; Massaouah; Djibouti	
	Daedalus Riff, Mersa Halaib, Raveiyah, Red Sea	
	Khor Dongonab, Lat. 21° 11′ N., to Lat. 20° 50′ N. Red Sea	Among coral on reef

SPECIES	HABITAT	DEPTH IN FATHOMS
biserrata (von Martens) 1868. .	Malakka	
	Singapore	
***bisquamosa** de Man 1905 . . .	Anchorage of Lirung, Salibabu-island	20
	Ralum, New Pommerania	
**Brockii* (de Man) 1888	Pulu Edam, Bay of Batavia	
	Madura-bay and other localities in the southern part of Molo-strait	38 to 50
	Pulu Kabala-dua, Borneo-bank	Reef
	Anchorage off Beo, Karakelang-islands	Reef
	Amboina	
	North of Waigeu Island, Lat. 0° 7′.2 N., long. 130° 25′.5 E.	32 to 46
	Pitatuki, on the island of Buka (German New Guinea)	
defensa (Rathb.) 1901	Off Boca Prieta, Porto Rico	$8^1/_2$

VI. Genus **Oxyrhynchaxius** Parisi 1917.

japonicus Parisi 1917	Enoshima, Japan	

VII. Genus **Calocaris** Bell 1853.

Subgenus **Calocaris** s. s.

aberrans Bouv. 1905.	Santa Lucia, Antilles	422
Alcocki Mc Ardle 1900.	Off N. E. Ceylon	
	Bay of Bengal, off Ceylon	542
	Cape Natal, N. by E., 24 miles	440
Barnardi Stebbing 1914	Cape Castle, E. $^1/_2$ N. 9 miles (near Saldanha Bay, Cape Colony)	89
Macandreae Bell 1853	Gulf of St. Lawrence, 20 miles south-west of the	
A. European form	south-west point of the island of Anticosti	
	South of West Iceland, Lat. 62° 40′ N., long. 22° 17′ W.	589
	From Trondhjem Fjord southward along the west and south coasts of Norway	Down to 217 at least 100 and 225
	Christiania Fjord	60 to 70
	Eastern part of the Kattegat	49 to 25
	Skagerrak	
	Korsfjord, Bömmelen	164 to 200
	West coast of Scotland. Firth of Clyde	
	Loch Fyne. Mull of Galloway	
	North Sea. Firth of Forth	
	Off the coast of Northumberland	57
	North-Hinder, Galloper and outer Gabbards light-ships	
	Between the east coast of Ireland and the Isle of Man	30—80
	Off the south-west coast of Ireland	447—515
	Plymouth	
	Mediterranean	Deep Water

SPECIES	HABITAT	DEPTH IN FATHOMS
	Adriatic	72 to 654
	Southern part of the Adriatic	61 to 650
B. Indian form	Arabian Sea	636
	Bay of Bengal, off Ceylon	800 to 637
	New Zealand	
	Subgenus **Calastacus** Faxon 1893.	
*euophthalma (de Man) 1905 . .	North of Batjan Island, Lat. 0° 11′ S., long. 127° 25′ E.	217
felix Alcock & Anders. 1899 .	Arabian Sea, off Cape Comorin	430
Investigatoris Anders. 1896. . .	Arabian Sea, off the coast of Sind	947
	South of Sannak Islands, Alaska	483
	Off Cascade Head, Oregon	345
	Off San Diego, California	417
longispinis (Mc Ardle) 1901. . .	Arabian Sea	300
	Gulf of Oman	700 to 689
	Table Mountain, South Africa	250
quinqueseriata (Rathb.) 1902 . .	Southern California from off Point Sur to Anacapa Island	160 to 388
*Sibogae de Man 1925	North of Batjan Island, Lat. 0° 11′ S., long. 127° 25′ E.	217
stilirostris (Faxon) 1893.	Off Acapulco	660
	VIII. Genus **Metaxius** Bouv. 1905.	
microps Bouv. 1905.	Santa Cruz, Antilles	115

Axius Leach

The genus *Axius*, established in 1815 by LEACH for a crustacean taken at Sidmouth amongst prawns on the shore, was subdivided in 1903 by L. A. BORRADAILE in his valuable paper "On the Classification of the Thalassinidea" (Annals and Magazine of Nat. Hist., Ser. 7, Vol. 12) into five subgenera *Axius* s. s., *Neaxius*, *Iconaxiopsis*, *Eiconaxius* and *Paraxius*, though the validity of the subgenus *Iconaxiopsis* did appear to him rather doubtful. This subgenus, indeed, should only differ from the subgenus *Eiconaxius* by the 2nd maxillipeds being provided with vestigial gills, namely by a podobranch and an arthrobranch, each of which consists of a tapering plate one edge of which is minutely and distantly plumose (A. ALCOCK, A descr. Catalogue of the Indian Deep-Sea Crustacea, Decapoda Macrura and Anomala in the Indian Museum, Calcutta, 1901, p. 193). The statement, however, that in the typical species of *Eiconaxius* and *Paraxius*, described in the Report of the Challenger Macrura, the 2nd maxillipeds should bear no vestiges of gills at all, may, as BORRADAILE remarks (l. c. p. 538, foot-note), perhaps be wrong, because, when examining the small type specimens of these species in the British Museum, it was very difficult for him to be certain of this point. As far as I am aware, only of two species of *Eiconaxius* the branchial formula is at present known, viz. of *E. acutifrons* Bate

and of *E. farreae* Ortm., while 15 species and 2 varieties are described; to the two typical species of *Iconaxiopsis* (*andamanensis* Alcock and *laccadivensis* Alcock) a third, *spiniger*, was added by Mr. Mac Gilchrist in 1905, but the vestigial gills on the second maxillipeds, that are characteristic of the subgenus, he was unable to find. Under these circumstances the validity of the subgenus *Iconaxiopsis* seems also to me doubtful and uncertain, so that in this work it is united with *Eiconaxius*.

At present of the genus *Axius* 33 species with 4 varieties are known, of which only 5 are referred to the subgenus *Axius* s.s., though perhaps *A. odontorhynchus* de Man will also once prove to belong to the subgenus *Neaxius*. Two species inhabit the coasts of Europe, *A. stirhynchus* Leach, the name of which, according to the Reverend Stebbing, may be guessed to signify "with a stiff rostrum" (A History of Crustacea, 1893, p. 188) and *A. nodulosus* Meinert. *Axius stirhynchus* Leach occurs on the coasts of Great Britain, on those of France and in the Mediterranean; in the Mediterranean it is, however, very rare, as is proved by the fact that it has been found still only two times in the Gulf of Naples, the first time in 1885, the second on the 22th March 1895, "nelle praterie di *Posidonia* presso Posillipo" (E. Caroli, Pubblicazioni della Stazione Zool. di Napoli, Vol. III, 1921, p. 254).

The other species, *A. nodulosus* Meinert, is imperfectly known by one single mutilated specimen from Nymindegab, west coast of Jutland (Confer p. 18).

A. stirhynchus is represented on the coast of Massachusetts, Rhode Island, and Connecticut by the closely allied *A. serratus* Stimps. Off the south coast of New England we find another species, *A. armatus* S. I. Smith.

Only two species are known from the Indopacific. *A. novae-zealandiae* Borr. is still only recorded from the North Cape, New Zealand; it belongs truly to this subgenus. *A. odontorhynchus* de Man, however, that was collected on the west coast of Great-Kei-Island and on the south coast of Timor, is allied to *A. laevis*, which, according to Prof. Bouvier, belongs to *Neaxius*, so that it should be referred perhaps also to this subgenus.

The subgenus *Neaxius* Borr., that differs from the subgenus *Axius* s. s. by the want of pleurobranchs on legs 2—4, includes 7 species and 2 varieties. *A. laevis* Bouv., which is distinguished from the 6 other species by a triangular rostrum, was taken by the Talisman south of the Canaries. *A. Gundlachi* (von Martens), a species of large size, attaining the length of 84 mm., is known from Cuba and the island of Curaçao; a most closely allied variety *orientalis* n. was collected many years ago by Dr. Finsch at Matupi, New Pommerania. *A. euryrhynchus* de Man, which was captured by the "Siboga" at the anchorage of Dongala, Palos-bai, Celebes, is referred by me to the subgenus *Neaxius*, because the rostrum presents the same characteristic form as that of *A. Gundlachi* and its variety *orientalis*; the two specimens, however, on which *A. euryrhynchus* was established, are only 11 mm. long, a dwarf, when compared with *A. Gundlachi*. Another indopacific species is *A. plectrorhynchus* Strahl, recorded both from the Indian Archipelago (Luzon, Amboina) and the east and south coasts of Australia. The three last species much agree with one another, especially as regards the shape of the front. *A. glyptocercus* von Martens from Cape York, Australia, does no more occur in literature since its first description in 1868, but the only known specimen, preserved in the Zoological Museum of Berlin, has quite lately been redescribed and figured by me (J. G. de Man, Bull. Soc. Zool.

de France, T. L., 1925, p. 50—56, fig. 1, 1*a*). The fourth indopacific species, *A. acanthus* A. M.-Edw., is known from New Caledonia, New Britain, West Celebes and Jaluit, one of the Marshall Islands; a variety *mauritiana* occurs at Mauritius. On the coast of Lower California, finally, this subgenus is represented by *A. Vivesi* (Bouv.), a detailed description with figures of which has also appeared in my just cited paper (l. c. p. 56—61, fig. 2, 2*a*).

The subgenus *Eiconaxius*, with which *Iconaxiopsis* is provisionally united, includes 18 species and 2 varieties. The West Indies and the Gulf of Mexico are inhabited by 5 species: *A. Agassizi* Bouv., *Borradailei* Bouv., *caribbaeus* Faxon, *communis* Bouv. and *rotundifrons* Bouv. besides by a variety *antillensis* Bouv. of *A. crista-galli* Faxon. From the west coast of America only 2 species are known, *A. acutifrons* (Bate) and *A. crista-galli* Faxon, both taken south of Panama. *A. asper* (Rathb.) was taken off Kauai, one of the Hawaiian Islands. From the Kermadec Islands 3 are recorded, *A. kermadeci* (Bate), *parvus* (Bate) and *kermadecensis* (Chilton), from Japan only one, *A. farreae* (Ortm.). In the Indian Archipelago 6 species have been observed, viz. *A. acutifrons* (Bate), *consobrinus* (de Man), *parvus* (Bate), *Sibogae* de Man and *Weberi* (de Man), all closely allied forms excepting *A. Sibogae* from the Sulu Sea, that differs from all other Axiidae by the singular shape of the inner uropod, while of *A. crista-galli* Faxon a variety *indica* was captured by the "Siboga" off the south-east coast of Great Kei Island. Neither from the Red Sea nor from the east coast of Africa, including the Cape of Good Hope and Madagascar, species of this genus are recorded, but in the Arabian Sea near the Laccadives and off the Travancore Coast *A. laccadivensis* (Alcock) was taken, in the Bay of Bengal *A. spiniger* (Mac Gilchrist) and off the west coast of the Andamans *A. andamanensis*: it is a remarkable fact that just these three species are the representatives of the subgenus *Iconaxiopsis*.

The subgenus *Paraxius* Bate, finally, distinguished from all the other species of *Axius* by its very small antennal thorns, includes only 2 species, of which the first described, *A. altus* (Bate), was taken north of New Guinea, the other, *A. tridens* (Rathb.), at the Hawaiian Islands and at Makatea, one of the Paumotu Islands.

Concerning the mode of life of most species of this genus little or nothing is known. *Axius stirynchus* Leach is a littoral species that, as Mr. Couch remarks, „has the habit of burrowing in the sand, from which it rarely emerges, and then it seeks shelter in a crevice covered with weeds, for it is sluggish in its motions, and, if distant from a soft bottom in which to sink, incapable of escaping an enemy. A female that I obtained, loaded with spawn, was dug out of the sand in the middle of summer". (Couch, in: Th. Bell, A History of the British Stalk-eyed Crustacea, London 1853, p. 229). A. Milne-Edwards says in his description of *A. acanthus*: "Elle vit enfouie dans le sable qui remplit les dépressions des récifs de coraux; on voit l'ouverture de ses galeries à une faible profondeur et les Canaques la prennent en lui présentant une paille qu'elle saisit et qu'elle tient avec une telle opiniâtreté qu'il est facile de la tirer ainsi hors de son trou." (Bull. Soc. Philom. Paris 1879, p. 8). Messr. Fulton and Grant write concerning *A. plectrorhynchus* in: Proc. Roy. Soc. Victoria, Vol. XIV (New Series), Pt. II, 1902, p. 60: "We have found it to be plentiful in the crevices of the rotten sandstone reef about 100 yards from the shore at Beaumaris, and about 3 to 4 fathoms below tide mark". Five species, belonging to the subgenus *Eiconaxius*, are found in sponges. *A. acutifrons* was taken by the "Siboga" off South point of Great Kei Island in 325 fathoms from a hexactinellid sponge,

A. farreae (Ortm.) and *A. caribbaeus* (Faxon) live as a commensal in sponges of the genus *Farrea* of the Family *Hexactinellidae*, the former also in a species of *Aphrocallistes* and *A. Weberi* was likewise taken out of *Hexactinellidae*. Concerning the mode of life of all the other species nothing is known, but it appears to me highly probable that they have likewise the habit of concealment, either burrowing in the bottom or living in crevices and little holes on the reefs or as commensals in sponges and other animals. The species of the subgenus *Axius* s. s. are littoral or live in general in shallow water or at small depths, *A. armatus*, however, was taken at 100 and 142 fathoms, while *A. laevis* was found at a depth of 381 fathoms. *A. glyptocercus* von Martens and *A. Vivesi* (Bouv.) are no doubt littoral or shallow water forms, like *A. acanthus* and *A. plectrorhynchus*. The species of the subgenus *Eiconaxius* show all a deep-water habitat, which in the same species may vary rather considerably. So e. g. *A. caribbaeus* was taken in 88, but also in 237 fathoms, *A. laccadivensis* in 360, 430 and 705 fathoms, the last number being the greatest depth at which a species of *Eiconaxius* has been observed. While *A. altus* (Bate), the type species of the subgenus *Paraxius*, was captured by the "Challenger" at the abyssal depth of 1070 fathoms, the other species, *A. tridens*, was taken in rather shallow water, 17 to 33 fathoms, a considerable difference indeed!

Key to the known species of the genus *Axius* Leach.

a_1 Flat area of back and cervical groove well marked. Eyes pigmented. Antennal thorns large.

b_1 Pleurobranchs on legs 2—4. Rostrum triangular, pointed . . . Subgenus *Axius* Leach.

c_1 No teeth on the gastric region back of the base of the rostrum.

d_1 Abdomen less broad than carapace. Upper border of the palm in both chelipeds of 1st pair thick and rounded . . . . *stirhynchus* Leach.

(Th. Bell, A History of the British Stalk-eyed Crustacea, 1853, p. 228; C. M. Selbie, The Decapoda Reptantia of the Coasts of Ireland. Part I. Palinura, Astacura and Anomura (except Paguridea). London 1914, p. 89, Pl. XIV, figs. 1—4.)

d_2 Abdomen broad and depressed, expanding laterally in the middle, much broader than the carapace. Upper border of the palm in both chelipeds of 1st pair thin and strongly carinated . . . . . *serratus* Stimps.

(W. Stimpson, in: Proc. Boston Soc. of Natural History, Vol. IV, p. 223, 1852; S. I. Smith, in: Proc. U. S. National Museum, Washington. Vol. III, for 1880, January 1881, p. 435).

c_2 Gastric region dentate back of the base of the rostrum.

e_1 Dorsal median carina armed with two (three in the male) spiniform teeth just back of the base of the rostrum, besides these no teeth on the gastric region. Eyes small and black. Upper border of the chelae of 1st pair of legs in the female sharp and carinated, fingers of both chelae longer than the palm (1st pair of legs of the male unknown) . . . . . *armatus* S. I. Smith.

(S. I. Smith, in: Proc. U. S. National Museum, Wash., Vol. III, for 1880, January 1881, p. 433.)

e_2 Besides those of the dorsal median carina still other teeth occur on the gastric region.

f_1 Flat area of back with, in the middle, an elongate-triangular patch of granules, that narrows forwards to become the median keel of the rostrum, where its granules pass into a single row of about a dozen of spines. Movable spine of antenna little longer than the stylocerite and hardly reaching beyond the middle of 4th antennal article. . . . . *novae-zealandiae* Borr.

(L. A. BORRADAILE, Decapoda of the British Antarctic („Terra Nova") Expedition, 1910. London 1916, p. 91, fig. 5.)

f_2 No median row of spines on the rostrum.

Rostrum a little shorter than 1st antennular article, eye-peduncles as long as rostrum. Movable spine of outer antenna much longer than the stylocerite and extending just beyond 4th antennal article . . . . . *odontorhynchus* de Man.

b_2 Pleurobranchs wanting [1]). Rostrum notched or emarginate anteriorly in the middle line . . . . . Subgenus *Neaxius* Borr.

g_1 Anterior dentate part of rostrum semicircular, broader than long, flattened.

h_1 Upper surface of rostrum covered with small rounded tubercles. Species of large size.

i_1 Proportion between width and length of telson in the adult male like 10,7 : 8; outer and inner side of the larger chela of the male finely granulate. West-Indian species . . . . . *Gundlachi* (von Martens)

(E. VON MARTENS, in: Archiv f. Naturgeschichte, XXXVIII Jahrg., 1 Bd. 1872, p. 132, Taf. V, fig. 15, 15*b*, 15*c*; J. G. DE MAN, in: Mitteilungen des Zoologischen Museums zu Berlin, Bd. 12, Heft 1, 1925).

i_2 Proportion between width and length of telson in the adult male like 10,7 : 8,9, the telson appearing a little less broadened; outer and inner side of the larger chela of the male less finely granulate. Pacific species.

Gundlachi (von Martens) var. *orientalis* de Man.

(J. G. DE MAN, in: Mitteilungen des Zoologischen Museums zu Berlin, Bd. 12, Heft 1, 1925).

h_2 Upper surface of rostrum smooth. Species of small size, 11 mm. long . . . . . *euryrhynchus* de Man

g_2 Dentate part of rostrum not semicircular, more or less excavate.

j_1 Rostrum triangular, equilateral, its upper surface deeply

---

1) According to BORRADAILE pleurobranchs are wanting in *A. plectrorhynchus* and *A. acanthus* (in: Annals Mag. Nat. Hist. Ser. 7. Vol. XII, 1903, p. 537). The gills of *A. glyptocercus* von Martens and *A. Vivesi* (Bouv.) could not be examined, because of these species only one single specimen is known; nevertheless they are considered by me to belong to the subgenus *Neaxius*, because these species are specifically closely related to *A. acanthus*.

excavate, terminal notch small, only visible by means of a magnifying glass. Telson one and a half as long as broad, presenting above four feeble divergent carinae. *laevis* Bouv. [1]).

(E. L. Bouvier, in: Bull. Muséum Nat. d'Hist. Nat. Paris, Année 1915, N°. 6, p. 182.)

j_2 Rostrum not triangular, its upstanding lateral borders parallel or almost parallel, the rostrum longer than broad, terminal emargination well developed, conspicuous.

k_1 At the base of the rostrum, in the median line, the carapace rises into an acute tooth, nearly of the same size as the lateral rostral teeth; in front of this tooth no median ridge on the rostrum.. Telson quadrate, without transverse carinae . . . . . *plectrorhynchus* Strahl.

(Strahl, in: Monatsber. K. Akad. Wiss. Berlin, 1861, p. 1060. fig. 2—4 and 11.

k_2 At the base of the rostrum, in the median line, the carapace does not rise into a tooth; a median longitudinal ridge on the rostrum. Telson broader than long, with transverse parallel carinae.

l_1 Telson with two transverse carinae. Upper border of palm of anterior legs rounded, unarmed [2]).

m_1 Of the two carinae the posterior is situated just midway between the anterior carina and the posterior margin of the telson. Stylocerite quite unarmed. On the anterior margin of the carapace, just outside the rostrum, between the eyepeduncle and the antenna a spine of the same size as that which occurs at the antero-external angle of the upper surface of the carapace . . . . . *glyptocercus* von Martens

(E. von Martens, in: Monatsber. Kön. Preuss. Akad. Wiss. zu Berlin, Nov. 1868, p. 613; J. G. de Man, in: Bull. Soc. Zool. de France, T. L., 1925, p. 50—56, fig. 1, 1*a*).

m_2 Of the two carinae the posterior is distinctly farther distant from the posterior margin of the telson than from the anterior carina. Stylocerite armed with spines. No tooth on the anterior margin of the carapace between the eyepeduncle and the antenna.

---

1) In Bouvier's original description of *A. laevis* the notch on the tip of the rostrum is not mentioned. I am indebted for the knowledge of its existence to Professor C. Gravier of the Paris Museum who kindly has examined for me the only type and wrote the following: „Le rostre de l'*Axius laevis* est échancré au sommet et n'est donc pas triangulaire au *sens géometrique* du mot; mais il est parfaitement correct, en français, de dire que ce rostre est de forme triangulaire, car les deux côtés ne sont pas parallèles et, de plus, sauf avec une loupe suffisante, l'échancrure de l'extrémité libre est peu évidente. Le mot triangulaire n'est pas pris au sens mathématique, et d'ailleurs, la base de ce triangle isocèle n'est pas nettement définie".

2) The larger cheliped of *A. glyptocercus* von Martens is unknown.

n_1 Anterior acute granule but one of the median ridge of the rostrum larger than the preceding, spines on the lateral side of carapace well developed, like also the tufts of setae on the 3rd—5th abdominal pleura . . . . . *acanthus* A. M.-Edw.

(A. MILNE EDWARDS, in: Bull. Soc. Philom. Paris, 1879, p. 8).

n_2 Median ridge of the rostrum smooth in the male, granular in the female, but the anterior granule but one not larger than the preceding; spines on the lateral side of the carapace poorly developed, like also the tufts of setae on the 3rd—5th abdominal pleura . . *acanthus* A. M. Edw. var. *mauritiana* Bouv.

(E. L. BOUVIER, in: Bull. Scientif. France et Belgique, 7e Sér., T. XLVIII, 1915, p. 19, fig. 7).

l_2 Telson with three transverse carinae. Upper border of palm of anterior legs armed along its whole length with acute spines. Median ridge on the rostrum with 2 granules of which the anterior is about of the same size as the lateral rostral teeth and twice as large as the posterior. Stylocerite armed with spines. No tooth on the anterior border of the carapace between the eyepeduncle and the antenna *Vivesi* (Bouv.)

(E. L. BOUVIER, in: Bull. Mus. d'Hist. Nat. Paris, 1895, N°. 1, p. 7; J. G. DE MAN, in: Bull. Soc. Zool. de France, T. L., 1925, p. 56—61, fig. 2, 2*a*).

a_2 Flat area of back and cervical groove more or less indistinct.

o_1 Pleurobranchs on legs 2—4. Antennal thorns large Subgenus *Eiconaxius* Bate.

p_1 Median carina of rostrum denticulate.

One, two or three teeth on the anterior border of the larger chela between the fingers.

q_1 Upper border of palm of the larger chela smooth.

r_1 No prominent teeth on the prehensile edges of the fingers of the larger chela.

Median dorsal carina of the rostrum cut into about 7 prominent teeth, so as to resemble a low cock's-comb. . . . . *crista-galli* Faxon

(W. FAXON, in: Memoirs of the Museum of Compar. Zool. at Harvard College, Vol. XVIII, 1895, p. 104, Pl. XXVIII, fig. 1—1h_1).

r_2 In the larger chela the dactylus bears a larger basal tooth, the immobile finger a prominent tooth not far from the middle. Larger chela as high near the finger-cleft as its upper border is broad . . . . . *asper* (Rathbun)

(M. J. RATHBUN, The Brachyura and Macrura of the Hawaiian Islands, Wash. 1906, p. 895, fig. 52).

q_2 Upper border of palm of the larger chela faintly denticulate along its whole length.
Two or three teeth on the anterior border of the palm of this chela between the fingers; the prominent ridge on the lower border of the palm finely denticulate. Median dorsal carina of rostrum cut into 16 small sharp teeth . . . . . *crista-galli* Faxon var. *indica* (de Man [1])

p_2 Median carina of rostrum smooth.

s_1 In both chelipeds of 1st pair the upper border of palm spinose in all its extent. [2])
A spinulose ridge along the outer margin of the broad lower border of the larger chela. . . . . *spiniger* (Mac Gilchrist

(A. C. Mac Gilchrist, in: Annals Mag. Nat. Hist. Ser. 7, Vol. XV, 1905, p. 240. — Illustrations Zoology Investigator. Crustacea (Malacostraca) Pt. XII, Calcutta 1907, Pl. LXXVIII, fig. 1).

s_2 In neither cheliped of 1st pair the upper border of palm spinose in all its extent.

t_1 Median dorsal crest armed with one to three small teeth back of the base of the rostrum.

u_1 Rostrum triangular, with the margins towards the apex smooth, but with a prominent tooth on each side at the base. Inner uropod of caudal fan rounded apically . . . . . *kermadecensis* (Chilton)

(Ch. Chilton, in: Transact. New Zealand Institute, Vol. XLIII, 1910, p. 550, fig. 1 and 2).

u_2 Rostrum triangular, with the distal half of the margins finely serrulate, but without a prominent tooth on each side at base. Inner uropod of caudal fan with an apical lobule, that makes a distinct angle with the posterior border. . . . . *Sibogae* de Man.

t_2 Median dorsal crest unarmed.

acutifrons (Bate). Rostrum triangular, with the edges slightly serrate. Larger chela with the upper border of the palm carinate, slightly serrulate near the distal extremity; immobile finger of this chela with a long flat central cusp and a few small serrate teeth between

1) The description or rather diagnosis of *Eiconaxius crista-galli* Fax. var. *antillensis* Bouv. is so brief and insufficient, that it proved impossible to include this variety into the Key (E. L. Bouvier, in: Compt. Rend. de l'Acad. des Sciences de Paris. T. 141. Paris 1905, p. 802—806).

2) In *A. acutifrons* one observes a slight serration near the acute distal extremity of the upper border of the larger chela, but no spines in all the extent of this border; a spinulose ridge along the outer margin of the lower border of this chela does in this species not occur.

it and the tip, dactylus with a rounded tubercle near the base. Smaller chela of the male with a truncate bicuspid lobe on the distal border of the palm, near the finger-cleft. Carpus of 2nd legs a little shorter than palm.

kermadeci (Bate). Allied to *A. acutifrons*, but the rostrum a little longer and less acutely pointed. Larger chela with a large open space between both fingers, anterior border of the palm and the contiguous part of the cutting-edge of the immobile finger serrate by several large teeth, cutting-edge of dactylus smooth. Carpus of 2nd legs distinctly shorter than palm.

(C. SPENCE BATE, Report on the Crust. Macrura of the Challenger Expedition, 1888, p. 43, Pl. V. fig. 3).

parvus (Bate). Rostrum little longer than broad, subacute, with the lateral edges smooth. Larger chela of the male with the upper border of the palm obtuse, not ridged, cutting-edge of the immobile finger with a blunt basal tooth, 4 or 5 much smaller teeth on the distal border of the palm, that are separated from the basal tooth by a notch. Tooth at the base of the dactylus rudimentary. In the smaller chela a strong sharp tooth on the distal border both of the outer and inner surface of the palm near the finger-cleft. Second legs as in *A. acutifrons*.

farreae (Ortm.). Rostrum triangular, almost twice as long as broad at base, lateral edges slightly serrulate. Larger chela much agreeing with that of *A. acutifrons*, upper border ending in an acute tooth, but with no serrulations posterior to it, immobile finger as in *A. acutifrons*, but dactylus without basal tooth; smaller chela with a sharp tooth on the distal border of the palm near the finger-cleft, in both chelae the outer and inner surfaces of the palm smooth and the upper border of palm and dactylus sharply carinate. Carpus of 2nd legs as long as the palm and 3-times as long as thick distally.

(A. ORTMANN, Die Decapoden-Krebse des Strassburger Museums. III Theil, 1891, p. 49, Taf. I, fig. 4).

caribbaeus (Faxon). Similar to *A. acutifrons*, but the rostrum much broader, less triangular in its outline and broadly rounded at the anterior end; upper border of palm of larger chela entire, not serrulate distally. Eyes more heavily pigmented.

(W. FAXON, in: Bull. Mus. Comp. Zool. at Harvard College, Vol. XXX, N° 3, Cambridge, Mass., 1896, p. 155, Pl. I, fig. 1- 4).

andamanensis (Alcock). Rostrum with the lateral edges quite smooth. Eyes unrecognizable, having no pigment. In one chela both edges of the finger-cleft are smooth and in the other the cutting-edge of the dactylus is notched to correspond with a slightly enlarged tooth on the fixed finger. Legs of 2nd pair like in *A. laccadivensis. (Iconaxiopsis).*

(A. ALCOCK, A descriptive Catalogue Indian Deep-Sea Crustacea. Decapoda Macrura and Anomura, in the Indian Museum. Calcutta, 1901, p. 196, Pl. II, fig. 1).

laccadivensis (Alcock & Anders.). Rostrum triangular with the lateral edges microscopically serrulate. Eyes very faintly pigmented. Fixed finger of the larger chela with two enlarged teeth near the finger-cleft, separated by a characteristic notch. Carpus of 2nd legs shorter than the palm, fingers $^1/_5$ the length of chela. Pleura 2—4 bluntly pointed. *(Iconaxiopsis).*

(A. ALCOCK, l. c. 1901, p. 195. — Illustrations Zool. Investigator. Crustacea. Part XI, Calcutta 1905, Pl. LXXI, fig. 3).

consobrinus (de Man). Rostrum narrow, 3-times as long as broad, subacute, edges slightly serrulate, in the female more distinctly than in the male. Eyes of the male uncoloured, of the female yellowish green. Upper border of the palm of both chelae of 1st pair ridged, that

of the larger ending in two small teeth. In both chelae the distal border of the palm entire, unarmed, smooth. Immobile finger of larger chela with one subacute tooth near the base, separated from the distal border of the palm by a characteristic notch, between this tooth and the tip the cutting-edge is finely denticulate; dactylus with a small, rounded tooth at the base. Immobile finger of smaller chela much higher at its base than the dactylus. Carpus of 2nd legs shorter than chela, but slightly longer than palm.

Weberi (de Man). Rostrum in the male one-fourth longer than broad, in the female about as long as broad, with obtuse tip, lateral edges finely serrulate. Both chelae with the upper border of the palm ridged and terminating in the smaller chela into one, in the other into 2 or 3 small teeth. Immobile finger of the larger chela with an obtuse, conical tooth just beyond the middle, between it and the articulation 3—5 smaller obtuse teeth, between it and the tip the cutting-edge is unarmed; dactylus with a broad, though low and obtuse tooth at base that is larger than the conical tooth of the immobile finger, the rest of the cutting-edge unarmed. Anterior border of palm of smaller chela with a sharp, simple or bicuspid tooth near the finger-cleft. Carpus of 2nd legs distinctly longer than the palm, though still slightly shorter than the chela and the merus; the carpus, near its distal extremity somewhat thicker or broader than the palm, is about 4-times as long as thick; fingers one-fifth the length of the chela.

Borradailei Bouv. Rostrum spathulate, broadly obtuse ("largement obtus") at the tip, lateral edges smooth. Median dorsal carina produced backwards on to the gastric region and widened. Chelipeds subequal, upper border of the palm rounded, fixed finger without prominent teeth. Chelae of 2nd pair barely longer than carpus. Abdominal pleura broadly obtuse ("largement obtus").

(E. L. Bouvier, in: Compt. rendus Acad. Sc. Paris. T. 141. Paris. 1905, p. 802—806).

rotundifrons Bouv. Rostrum spathulate, broadly obtuse ("largement obtus"), lateral edges smooth. Median dorsal carina not produced backwards on to the gastric region. Chelipeds of different shape, with the upper border of their palm slightly carinate; prehensile edge of fixed finger of the larger chela with a long tubercle, fingers of smaller chela about twice as long as the palm. Chelae of 2nd pair barely longer than the carpus. Pleura of the 2nd and 3rd abdominal segments acutely pointed.

(E. L. Bouvier, l. c. 1905).

communis Bouv. Rostrum spathulate, broadly obtuse ("largement obtus"), lateral edges smooth. Median dorsal carina not produced backwards on to the gastric region. Chelipeds of different shape, with the upper border of their palm slightly carinate; prehensile edge of fixed finger with subequal teeth, fingers of smaller chela about twice as long as the palm. Chelae of 2nd pair conspicuously longer than carpus. Pleura of the 2nd and 3rd abdominal segments bluntly pointed.

(E. L. Bouvier, l. c. 1905).

Agassizii Bouv. Rostrum triangular, acute or subacute, with the lateral edges usually serrulate. Median dorsal carina not produced backwards on to the gastric region. Chelipeds very unequal, fingers of the smaller chela at least twice as long as the palm; in both

chelae upper border of palm strongly carinate. Fixed finger of larger chela with a long tubercle that ends in a tooth and that corresponds with a notch of the dactylus. Chelae of 2nd pair a little longer than carpus, fingers half as long as palm. Pleura of the 2nd and 3rd abdominal segments acutely pointed.

(E. L. BOUVIER, l. c. 1905).

o_2 No pleurobranchs. Antennal thorns small . . . Subgenus *Paraxius* Bate

v_1 Rostrum flat, triangular, with the apex acute, little shorter than the antennular peduncle, the margins serrate, with 3 or 4 upwardly-curved teeth on each side. Telson rectangular with truncate posterior margin, sides little converging backwards. . . . . *altus* (Bate)

(C. SPENCE BATE, Report Challenger Macrura. 1888, p. 37, Pl. V, fig. 1*d*—*g*).

v_2 Rostrum triangular, short, barely reaching end of eyes, considerably shorter than the antennular peduncle, with a tuberculiform tooth on either side; the three projections of the rostrum are much sharper in the male. Telson triangular, with rounded tip and with the sides rather much converging backwards . *tridens* (Rathb.)

(M. J. RATHBUN, The Brachyura and Macrura of the Hawaiian Islands. Wash. 1906, p. 895, Fig. 53*a*—*d*).

In this key *Axius nodulosus* Meinert has not been included. This species was established on a single mutilated specimen from Nymindegab, west coast of Jutland — but was never more found back! The rostrum, the eyes and the two pairs of antennae are unknown, so that I will confine myself to referring to MEINERT's original description and to a paper of Mr. STEPHENSEN of 1909, in which figures are given of the two pairs of chelipeds, of the leg of the penultimate pair and of the caudal fan.

(FR. MEINERT, Crustacea Isopoda, Amphipoda et Decapoda Daniae, in: Naturhist. Tidsskrift, 3. R., vol. II, 1877, p. 212; K. STEPHENSEN, in: Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjøbenhavn for Aaret 1909, Kjøbenhavn, p. 276, fig. 1—5).

1. *Axius* (? *Axius*) *odontorhynchus* de Man. Pl. I, Fig. 1—1*m*.

Axius (*Neaxius*?) *odontorhynchus* J. G. de Man, in: Tijdschr. Nederl. Dierk. Vereen. (2) Dl. IX, Afl. 3, 1905, p. 591.

Stat. 260. Dec. 16 and 18. Lat. 5° 36′.5 S., long 132° 55′.2 E. 2,3 miles N., 63° W. from the North point of Nuhu Jaan, Kei Islands. 90 m. Bottom sand, coral and shells. 1 male.

Stat. 294. January 23th, 1900. Lat. 10° 12′.2 S., long. 124° 27′.3 E. Anchorage South coast of Timor. 73 m. Bottom soft mud with very fine sand. 1 egg-bearing female.

A new species, probably of small size. Length of the male from Stat. 260 from tip of rostrum to end of telson 7,8 mm., the carapace measuring 2,86 mm., the abdomen 4,94 mm.

Carapace smooth, narrowing anteriorly, 1,5 mm. broad at the branchial regions and 0,9 mm. anteriorly. The pointed rostrum (Fig. 1, 1*a*, 1*b*), which is slightly inclined downward, is triangular, 0,6 mm. long, about one-fifth the length of the carapace and reaches almost to the distal end of 1st joint of antennular peduncle; it is one and a half as long as broad at its base and the tip is slightly upturned. The barely concave, lateral margins are armed with 6 or 7 equidistant, upstanding, subacute teeth that are all directed forward and the borders are produced on to the gastric region as sharp ridges that first diverge and afterwards curve inward, reaching as far as the middle of the gastric region; they carry, just in front of the bend, a low subacute tooth, directed forward and behind it, at the bend, another smaller one. Between the rostral teeth long setae are implanted and 2 or 3 occur on the upper surface just near the last tooth. The gastric region is carinate in the middle line anteriorly; the sharp carina does not extend to the middle of the rostrum nor posteriorly to the cervical groove. The two grooves that define the gastric region anteriorly, are distinct and situated at a distance of 0,15 mm. from the anterior border of the carapace; just in front of them 2 or 3 setae are implanted. The median carina carries, immediately before and behind these grooves, a small subacute tooth; these teeth are of equal size. Like in *Axiopsis* (*Paraxiopsis*) *Brockii* the gastric region is furnished, at either side of the middle line, with a submedian carina, about midway between the middle line and the curved lateral carinae; the two submedian carinae that slightly converge forward, terminate anteriorly each in a low subacute tooth, just behind the grooves that define the gastric region anteriorly; these teeth, i. e. the anterior extremities of these submedian carinae, are half as far distant from the base of the rostrum as the latter is long. The submedian carinae are interrupted in the middle and the posterior part terminates anteriorly also in a tooth, that is lower and smaller than the anterior; in the interruption a seta is implanted and at each side of these carinae there are a few other setae, as also posterior to them. The cervical groove is rather deep, its distance from the tip of the rostrum is twice as large as the distance from the obtuse posterior end of the carapace. At either side of the middle line and near it, one observes two or three setae. The anterior margin of the carapace is quite unarmed, the angle between the eyepeduncles and the antennal peduncle (Fig. 1*b*) is rounded; just near that angle the carapace carries a hair and a few hairs are implanted on the lateral walls of the carapace, just below the lateral ridges of the gastric region.

The abdomen is not yet twice as long as the carapace, the proportion being as 7 : 4. The 1st somite is short and 3-times as broad as long; its anterior border is concave and joins to the obtuse posterior extremity of the carapace. The 2nd somite is twice as long as the 1st, the exposed part being 0,64 mm. long; the three following somites are subequal, barely shorter than the 2nd. The 6th somite (Fig. 1*c*) is 0,68 mm. long, nearly as long as the preceding and twice as broad as long, viz. 1,3 mm.; the 2nd somite being 1,4 mm. broad, almost as broad as the carapace, the abdomen proves to narrow very little posteriorly. The posterior margin, 0,82 mm. broad, of the 6th somite is slightly emarginate in the middle and at each side, the median emargination being 0,34 mm. broad; at the outer side of the obtuse angles of the latter a few hairs are implanted, that are 0,65 mm. long. The telson is 1,35 mm. long, the median tooth of the posterior margin included and 1,3 mm. without it, the telson being twice as long as the 6th somite; the lateral edges are armed anteriorly, at $^1/_4$ its length

from the anterior border, with a strong curved tooth and the telson presents here its greatest width of 1 mm.; at the right side this tooth is wanting, the edge being here apparently injured. The lateral borders of the telson that is one-fourth longer than broad, converge a little backward, so that their posterior extremities are 0,67 mm. distant from one another; they are armed in the middle with two sharp teeth, that are a little smaller than the just described tooth; the anterior of the two is twice as far distant from the foremost tooth as from the other and the latter as far from the posterior extremity of the lateral margins as from the anterior of the two. A movable spine is inserted at the posterior extremity of the lateral edges; this spine, 0,08 mm. long and 0,02 mm. thick at its base, is a little longer but less broad than the two teeth on the middle of the lateral edges; close to it another also movable spine is implanted that is one and a half as long and one and a half as thick as the other. There is a sharp tooth at the middle of the rounded, posterior margin, which is 0,07 mm. long and 0,04 mm. broad at its base and continuous with the upper surface of the telson. The upper surface carries 3 pairs of sharp teeth. Those of the anterior pair are the largest of all, 0,1 mm. long, implanted immediately behind the level of the foremost teeth of the lateral borders and near one another, the distance between their tips, 0,16 mm., being only $^1/_6$ of the greatest width of the telson. The spines of the following pair are the smallest, only 0,03 mm. long, and implanted, nearly on the middle of the telson, far from one another, the distance between their tips measuring 0,52 mm.; those of the posterior pair, finally, are 0,045 mm. long and implanted, at a distance of 0,54 mm. from one another, just at the level of the 2nd marginal teeth. A transverse row of long setae is situated at $^1/_5$ its length from the anterior border, other long setae occur near the teeth on the upper surface and near the posterior border midway between the middle line and the lateral edges and there are also a few just near the latter.

When directed backward, the inner caudal swimmeret reaches barely beyond the telson, the outer not at all. The basal joint carries a very small tooth just near the notch on its lateral margin. The oval outer swimmeret is 1,26 mm. long, just as long as the telson and one and a half as long as broad; its slightly curvate, anterior border is armed along the greater distal half with 11 or 12 small, sharp teeth. Near the distal end (Fig. 1*d*) of the anterior border two movable spines are inserted as usual and the apical edge appears here for a very short distance truncate; of the two spines the posterior, 0,11 mm. long, is a little longer than the other. The arcuate posterior border curves into the likewise arcuate apical edge, there where both pass into one another one observes a strong, sharp, brown-coloured tooth, 0,11 mm. long and 0,04 mm. broad at its base, and between this tooth and the two movable spines at the far end of the anterior border three slender, smaller, uncoloured spines occur that are 0,05 mm. long and 0,015 mm. broad at their base. The two longitudinal ridges are feeble, the anterior carries a row of 4 sharp teeth, the posterior is rudimentary and one observes, just near the basal joint, between both ribs a small tooth. Some setae occur near the anterior border and on the apical margin, whereas the apical and the inner border are fringed, as usual, with plumose hairs. The inner swimmeret is also 1,26 mm. long, but its shape is different; it is more rectangular and just half as broad as long. The straight anterior border is armed on the left swimmeret with 5 small, sharp teeth, of which the 1st occurs just beyond

LIBRARY
FISH & WILDLIFE SERVICE
PACIFIC OCEANIC FISHERY
INVESTIGATIONS

the middle, on the right with 7, the 1st very small and just in the middle. The apical border, rather short, is straight and truncate, whereas the posterior is slightly curved; at either extremity of the apical border occurs a strong, brown coloured tooth and these teeth are larger than those of the anterior border; the posterior, 0,1 mm. long and half as broad at its base, is a little larger than the other; between both teeth that are a little curved backward, 4 small, slender, uncoloured spinules are inserted, resembling those on the apical border of the outer swimmeret. One observes on the middle of the midrib 2 small spines at some distance from one another, it bears also a few long setae, like near the anterior margin.

The pleura are well developed, those of the 1st somite end in a sharp point, those of the 2nd are rounded anteriorly. The oblique anterior and the posterior border of the three following are straight; they carry a small acute tooth on the angle, which the anterior border makes with the lower, the posterior angle is obtuse or rounded. The triangular pleura of the 6th somite end also in a sharp tooth and their posterior border is concave; this somite is slightly convex from before backwards and carries, like the others, a few setae above.

The eyestalks that reach as far forward as the rostrum, are large and stout; the eyes are distinctly facetted, of a yellow-whitish colour and one observes in the centre of the eye a speck of a darker pigment. The internal antennae, measured from the anterior border of the carapace until the extremity of the inner or lower flagellum, appear to be 3,65 mm. long, a little longer than the carapace, the peduncle measuring 0,95 mm.; the 2nd and the 3rd joint measure together one-third the length of the whole peduncle and are of equal length. The thicker, outer flagellum is 2,5 mm. long and, being 0,1 mm. thick proximally, tapers regularly; it is composed of 20 joints, of which the first, looked at from above, appear nearly as long as broad, the following distinctly more or less longer than broad; the 12 last joints carry olfactory filaments. The other flagellum, 2,7 mm. long, is a little longer than the outer and only nearly half as thick, being 0,055 mm. thick proximally; this likewise tapering flagellum is composed of 18 or 19 slender joints that are nearly all 3- or 4-times as long as thick; setae of various length are inserted on their distal extremities.

The antennal peduncle extends by the distal fourth part of the 4th or penultimate joint beyond that of the inner antennae. There is a small, sharp tooth at the distal end of the lower surface of the 1st joint (Fig. 1*b*); the large, spiniform stylocerite, that is obliquely directed upward, reaches almost as far forward as the antennular peduncle and the still larger movable spine, the scaphocerite, extends even beyond the distal end of the penultimate joint; both spines carry a few setae on their outer margin and their tips are white. The lower margin of the 3rd joint ends in a sharp spine, which, directed obliquely downward, reaches almost to the middle of the penultimate joint. The penultimate or 4th joint is 0,5 mm. long and rather not slender, being 4-times as long as thick, looked at from above; the last joint, that slightly thickens distally, measures three-fifths of the penultimate; both the penultimate and the terminal joint carry some setae at the distal end, above and below. Flagella missing.

External maxillipeds pediform and large. The ischium, measured along its straight, outer margin, appears to be 0,6 (0,8) [1]) mm. long and twice as long as broad, presenting its greatest

1) The numbers in parenthesis are those of the female from Stat. 294.

width of 0,3 (0,37) mm. somewhat nearer to the base than to the distal border, which, articulating with the merus, is 0,24 (0,32) mm. broad. The merus is shorter, 0,5 (0,64) mm. long and 0,26 (0,34 mm.) broad not far from the ischium; the inner margin is armed, in the right footjaw (Fig. 1*f*) with 2 sharp spines, of which the anterior, 0,11 mm. long, is placed at $^1/_4$ the length of the inner margin from the carpal articulation, the other, half as long, in the middle. In the left maxilliped the merus carries but one spine, (in the female two), the larger one, also 0,11 mm. long, at one-third the length of the inner margin from the distal end. The carpus, which is just as long as the merus, both in the male and in the female, carries a short, acute tooth, 0,045 mm. long, at the distal end of its lower margin; the carpus is $2^1/_2$-times as long as broad. The propodus is a little shorter than the carpus and the tapering dactylus, 0,35 (0,46) mm. long, is still shorter and not yet 3-times as long as thick. The crest on the inner side of the ischium is composed of 30—32 sharp teeth, both in the male and in the female, and is curved inward at its base. The slender exopod is very long and furnished at its distal end with long setae.

Of the unequal legs of the 1st pair of the male the left (Fig. 1*g*) is the larger. The inner margin of the coxae carries a very small, sharp tooth at the distal end. There is an obtuse tooth at the distal end of the sharp, lower border of the ischium and 2 or 3 much smaller teeth behind it. The merus is short and stout; that of the left leg is 1,5 mm. long and one and a half as long as broad, presenting its greatest breadth of one millimeter a little beyond the middle, whereas it is 0,6 mm. broad at the articulation with the ischium. The strongly curved upper border is armed, at $^1/_3$ its length from the distal extremity, that ends in a sharp angle, with a small acute tooth, directed forward. Near this tooth one or two setae occur on the outer surface, 2 or 3 at the distal end of the upper border and a few are observed between this tooth and the carpal articulation. The arcuate lower margin (Fig. 1*h*) is armed with 12 equidistant, sharp teeth that are all small, excepting the foremost one that is larger, 0,17 mm. long and the penultimate which is half as long, whereas the rest are still smaller. The unarmed carpus is short, 0,75 mm. long and 0,94 mm. broad at the distal border, that articulates with the palm. The larger chela is 2,7 mm. long; the palm 1,6 mm. long and 1,32 mm. broad, is a little longer than broad and one and a half as long as the fingers, that shut together when closed. The immobile finger is triangular, the tip very slightly curved upward and this finger carries (Fig. 1*i*) along its whole length 8 or 9, low, obtuse or rounded teeth of unequal size; the dactylus has similar teeth, its tip is a little bent downward. Tufts of setae occur on the outer side of the fingers, a few also on the distal part of the outer surface of the palm.

The right chela is 2,5 mm. long, barely shorter than the other, but the palm is almost as long as the fingers: the palm is namely 1,3 mm. long and just 1 mm. broad or high, its upper border ends distally in a small sharp tooth. The fingers are of a less stout shape than those of the left leg, they are slenderer and their prehensile edges are straight and faintly denticulate on their distal half, bearing here several small teeth that on the immobile finger are a little larger than on the dactylus; fingers and palm are hairy, like on the other leg. On the outer surface of both chelae a longitudinal, somewhat hairy ridge or crest runs, close to the lower border, from the carpal articulation to the tip of the immobile finger.

The coxae of the legs of the 2nd pair carry a small acute tooth at the distal end of their inner margin, perhaps also one at the proximal extremity; the following joints are unarmed. The slender merus is 1,52 (2) mm. long and 4 (4,3)-times as long as broad; the carpus is 0,92 (1,16) mm. long, its greatest breadth not far from the distal end is one-third (a little more than one-third) of its length. The chela is 1 (1,16) mm. long and the palm a little shorter than the fingers that shut close together, the proportion being as 2 : 3; the palm is just as high at the articulation of the fingers as it is long. The immobile finger carries 17 or 18 small teeth along its whole length, some occur also on the distal half of the dactylus; the fingers present each a tuft of hairs and setae occur also on the preceding joints.

The coxae of the 3rd legs (Fig. 1*j*) that have a stout shape, are armed with a sharp tooth at the distal end of their inner border and a much smaller tooth is observed on the outer side on the anterior border of the coxa. The merus, 1,3 mm. long, is 3-times as long as broad; both margins are slightly arcuate and there are 2 minute teeth on the middle of the lower border that carries also a few setae. The carpus, 0,75 mm. long, is 0,27 mm. thick, almost 3-times as long as thick. The propodus, 0,8 mm. long, presents its greatest breadth of 0,26 mm. at $^1/_3$ its length from the carpal articulation; this joint is also 3-times as long as broad and narrows a little towards the distal end, being here 0,19 mm. broad; the lower margin bears 7 sets of movable spines, each composed of three, except the two first that consist of two only and the last that is formed by four, and near each set 2 or 3 fine setae are implanted; in each set the spines grow shorter from the lower margin upward. The short and stout dactylus (Fig. 1*k*) is 0,36 mm. long, almost half as long as the preceding joint; the lower margin carries five sharp movable spines and ends in a sharp claw; parallel with the lower margin the outer surface carries in the middle another row of 5 movable spines of the same size.

The legs of the 4th pair resemble those of the 3rd, but the merus is unarmed and the propodus that is 0,92 mm. long and 4-times as long as broad, being 0,23 mm. broad not far from the proximal end, shows a more slender form; its lower margin carries 8 sets of movable spines, consisting the first of 2, the three distal ones of 3 spines. The dactylus, 0,4 mm. long, almost half as long as the propodus, is 3-times as long as broad at its base and appears also a little more slender than that of the 3rd pair; its lower margin bears 6 spines, besides the terminal claw, but there are also 5 spines on the outer surface.

The legs of the 5th pair (Fig. 1*l*) are much feebler and slenderer than the two preceding pairs. The merus is 0,75 mm. long and almost 4-times as long as broad (0,2 mm.); the carpus is 0,54 mm. long and 3-times as long as thick. The slightly arcuate propodus is 0,95 mm. long and widens a little from the proximal to the distal extremity, being 0,15 mm. broad at the proximal extremity, 0,175 mm. in the middle and 0,18 mm. at the distal extremity, so that it is about 6-times as long as broad; the propodus is unarmed, like the preceding joints, but a tuft of hairs occurs at the distal end. The dactylus (Fig. 1*m*) is 0,37 mm. long, not yet half as long as the propodus and nearly 4-times as long as broad; 5 spines of which the middle one is a little larger than the rest, occur on the distal half of its lower margin. The dactylus carries, like the preceding joints, a few setae and is armed on the distal half of its inner surface with 3 slender spines near the anterior border.

First abdominal somite devoid of appendages. Those of the four following are biramous, the rami foliaceous, but narrow, fringed with long, plumose and articulated hairs and implanted on a rather long peduncle. The appendages of the 2nd somite carry a stylamblys and an appendix masculina, those of the three following somites only a stylamblys. The protopod of the pleopods of the 2nd somite is 0,7 mm. long, 0,2 mm. thick, not yet 4-times as long as thick; the exopod is 0,85 mm. long and 5-times as long as broad, presenting its greatest breadth of 0,17 mm. at $^1/_3$ its length from the base; the endopod is 0,8 mm. long and 7-times as long as broad, its greatest width of 0,14 mm. near the insertion of the stylamblys. The stylamblys, provided with a few cincinnuli, is 0,28 mm., the appendix masculina, inserted between the stylamblys and the endopod, 0,31 mm. long; both are implanted at a distance of 0,26 mm. from the base of the endopod, i. e. at $^1/_3$ of its length; both the stylamblys and the appendix masculina are 10-times as long as broad and the latter carries five stiff bristles at and near the distal end.

Unfortunately the egg-bearing female from Stat. 294 has been overlooked, when in 1905 the Thalassinidea were determined and described by me, a fact so much the more deplorable, because it is a female. Measured in the middle line from tip of rostrum to end of telson, the carapace proves to be 4 mm., the abdomen 6,8 mm. long, the whole length 10,8 mm., so that this specimen is almost one and a half as long as the male which should be considered as the type. The rostrum reaches as far forward as in the male, but, being also 0,6 mm. long, it appears comparatively shorter, measuring only $^1/_7$ the length of the carapace. The tip of the rostrum looks, like in the male, a little asymmetrical, but, while in the male the larger of the two terminal teeth, which is the proper tip, is situated on the left side (Fig. 1*a*), in the female the right tooth is the larger. Posterior to these terminal teeth the lateral margins of the rostrum are armed each with 5 teeth; on either margin the distance between the 1st or anterior tooth and the 2nd appears a little longer than the subequal distances between the following and, like in the male, the teeth on the right margin are situated a little more forward than those on the left.

Besides the tufts of setae on the posterior margin of the 6th abdominal somite, this somite bears at either side of the median line still two other tufts of long hairs, the anterior just in the middle of the somite, the other between this tuft and that on the posterior margin. The telson, 1,8 mm. long and, anteriorly, 1,35 mm. broad, shows the same form as in the male, but, posterior to the large anterior tooth, the lateral edges bear only one tooth, instead of the two that exist in the male; measured in the median line this tooth appears just as far distant from the anterior tooth as from the point of the median tooth (long 0,08 mm.) on the posterior margin. While just near the posterior extremity of the lateral margins of the telson the male carries two movable spines, the female bears here only one that is 0,1 mm. long. The upper surface of the telson carries probably the same three pairs of small spines as in the male, but it appears still more setose than in Fig. 1*c*. The anterior border of the right outer swimmeret presents 9, that of the left 10 small teeth; quite near the posterior extremity of the anterior border not two movable spines occur, but only one and close to this spine one observes on the upper surface 3 small spines (Fig. 1*e*), of which the apical one is a little larger than the two others that are of unequal size; the outer longitudinal rib of the upper surface carries,

like in the male, 5 small spines, of which the 1st is placed close to the basal joint. At the junction of the apical and the inner border both of the outer and the inner uropod one observes the same brown coloured spine as in the male and between the long feathered setae of the apical border also small uncoloured spinules are observed. The inner uropod agrees with that of the male.

The eyes are as conspicuously facetted as in the male, but they show an ochraceous colour, while a hemispherical speck of black pigment is observed in the centre, that does occupy only the inner half of the eye. Measured from the anterior border of the carapace to the extremity the lower or thinner flagellum of the internal antennae proves to be 4,3 mm. long, while the upper flagellum is but 0,1 mm. shorter; peduncle 1 mm. long. The inner antennae are thus comparatively a little shorter than in the male, — this may depend either on the difference of sex or on that of age — but, like in the male, they are a little longer than the carapace. The right upper flagellum is composed of 25, the left of 27 joints; the lower flagella consist of 19 or 20 joints. The peduncles both of the inner and outer antennae agree with those of the male, the antennal flagella are incomplete.

Of the left maxilliped of the 2nd pair of the female the merus or 4th joint is 0,68 mm. long and 0,19 mm. broad, $3^1/_2$-times as long as broad; the exopod which is 0,9 mm. long without the feathered setae at the tip that measure 0,5 mm., reaches by $^1/_5$ its length beyond the 4th joint of the endopod; the peduncle is 0,34 mm. long, the multiarticulate flagellum 0,56 mm., the former reaching almost to the middle of the 4th joint. The right leg of the 1st pair that is the larger one, resembles that of the male, but the chela appears a little less high or broad in proportion to its length, the chela, indeed, is 3,5 mm. long (palm 2,1 mm., fingers 1,4 mm.) and 1,6 mm. high. The smaller cheliped also agrees with that of the male and on the outer surface of both chelae one observes the same, slightly hairy, longitudinal ridge or crest near the lower border. The other peraeopods are as in the male.

The pleopods of the 1st abdominal somite of the female are uniramous, slender filaments, 0,85 mm. long, those of the four following somites resemble those of the male and are all provided with a stylamblys. So e.g. of the pleopods of the 2nd somite the peduncle or protopod is 1 mm. long, 0,3 mm. broad, the rami both 1,16 mm. long, the outer about 5-, the inner 7-times as long as broad; the slender stylamblys is 0,44 mm. long, its distance (0,4 mm.) from the protopod almost as long and the stylamblys that carries a few cincinnuli at the slightly swollen tip, is 20-times as long as thick in the middle. Of the pleopods of the 5th somite the two rami are of unequal length, the inner 1,24 mm. long, the outer 1,08 mm., their form, however, is the same as of those of the 2nd somite; the stylamblys is 0,35 mm. long, its distance (0,44 mm.) from the protopod not shorter but a little longer than its length.

Number of ova small, about a dozen, eggs globular, diameter 0,95—1 mm.

2. *Axius (Neaxius) euryrhynchus* de Man. Pl. I, Fig. 2—2*e*; Pl. II, Fig. 2*f*—2*k*.

Axius (Neaxius?) euryrhynchus J. G. de Man, in: Tijdschr. Ned. Dierk. Vereen. (2) Dl. IX, Afl. 3 and 4, 1905, p. 590.

Stat. 86. June 18/19. Anchorage off Dongala, Palos-bay, Celebes. 36 m. Bottom fine grey mud. 2 females without eggs.

Unless these two specimens are young, this remarkable new species is one of small

size. Measured in the middle line the larger specimen appears to be 11,06 mm. long, the carapace measuring 4,56 mm., the abdomen 6,5 mm. The flattened gastric region (Fig. 2) passes anteriorly into a slightly inclined, broad, flat or a little concave rostrum, that almost reaches to the distal end of the 2nd antennular article; the regularly arcuate, anterior margin presents in the middle line a small concave notch, 0,075 mm. deep and 0,11 mm. broad, and about in the middle of its length at the level of the eyes the rostrum is slightly constricted, being here 0,67 mm. broad, whereas it shows its greatest breadth of 0,7 mm. just in front of this constriction. The arcuate, lateral margins of the rostrum (Fig. 2 and 2*a*) are armed, between the median notch and the constriction, on the left side with 8, on the right with 7 teeth; these teeth are rather small, sharp, turned upward and nearly all of equal size, those of the 1st pair at the angles of the median notch being a little smaller than the rest. Between each tooth and the next a short hair is inserted. Behind the constriction the sharp, carinate, lateral margins are continued on to the carapace until about midway between the anterior border and the cervical groove, diverging somewhat backward, so that they are 1,2 mm. distant at their posterior extremities, this distance being the width of the gastric region; behind their posterior extremities they pass into a row of coarse puncta until near the cervical groove, towards which the two rows converge, whereas the gastric region appears between the two rows smooth and shining. Near these carinate, lateral margins of the gastric region very short setae are implanted in a row behind one another. The rostrum is distinctly carinate in the middle line, the sharp carina reaches nearly to the median notch and posteriorly until a little behind the oblique grooves that define the gastric region anteriorly. The cervical groove is conspicuous and its median dorsal part, which is straight and transverse, is situated at a distance of 1,45 mm. from the obtuse posterior extremity of the carapace, i. e. about at $^1/_3$ of its length; this posterior extremity is fringed with short hairs. The anterior margin of the carapace is deeply emarginate immediately below the antennal peduncle and at the upper end of this concavity one observes an extremely small, sharp, antennal tooth that is turned outward. The smooth cardiac region is rather well defined, posteriorly, by two oblique furrows; another furrow, that runs parallel with the lateral parts of the cervical groove and that unites with it at some distance from the anterior margin of the carapace, defines the branchial regions above. The latter are closely punctate and somewhat rugose, but the lateral walls of the gastric region that fall vertically down, are smooth and shining.

The abdomen is not yet one and a half as long as the carapace, the 2nd and 6th somites that are equally long, are little longer than the 3rd—5th, which are subequal. The smooth rounded terga are distinctly separated from the well developed pleura by a longitudinal furrow and the pleura are not vertically deflexed, but somewhat obliquely, so that the abdomen appears rather broad. The pleura of the 1st somite taper regularly and their slender pointed extremity is curved forward. The pleura of the 2nd somite are distinctly concave anteriorly and again posteriorly; those of the 3 following are quadrate and their surface also concave posteriorly, so that their upper part is protuberant. The slightly arcuate, posterior border curves regularly into the lower, which, in the pleura of the 3rd and 4th somites, is a little concave; the angle that the lower margin makes with the anterior, is also obtuse or rounded and unarmed; those of the 6th somite, however, end in a small sharp tooth that is directed backward. The

pleura of the 6th somite, which is 1,1 mm. long and 1,45 mm. broad, carry an incision at $^1/_3$ of their length from their posterior margin.

The telson (Fig. 2*b*) is 1,45 mm. long, when the median tooth of the posterior margin is included, appearing thus a little longer than the 6th somite, whereas it is 1,28 mm. long without that tooth; the greatest breadth, anteriorly, is 1,22 mm., the telson is thus almost just as broad as long, exclusive of the posterior tooth. The lateral margins converge slightly backward, the posterior margin is therefore only 0,7 mm. broad, little more than half the greatest width; the sharp immobile tooth of the posterior margin is 0,15 mm. long and 0,055 mm. broad at its base, nearly 3-times as long as broad and it is continuous with the upper surface of the telson. At the posterior extremity of the lateral margins a small, movable spinule, only 0,03 mm. long, is inserted and near it on the posterior margin another about of the same size; two similar spinules, also of the same size, occur on the lateral edges, the anterior at one-third their length from the posterior extremity, the posterior 3-times as far distant from the posterior extremity as the two spinules that occur on the latter, from one another. The posterior margin is fringed with feathered setae, that are twice as long as the median spine; on the lateral edges they are shorter. The posterior margin carries at either side of the middle some plain hairs, as long as the feathered setae and short setae are implanted near the lateral margins; there are no spinules on the upper surface, on which a few short setae are symmetrically implanted.

The caudal swimmerets, directed backward, reach just as far as the telson, without the median tooth; their basal joint is unarmed. The exopod, 1,3 mm. long and 0,8 mm. broad, is obovate and one and a half as long as broad; the slightly arcuate, anterior margin curves regularly into the rounded apical border and the latter into the inner. The anterior and the apical border are armed on the right exopod with 19 small, sharp, immobile teeth that are nearly all of the same size and 0,06 mm. long; on the left there are only 16 teeth, but some seem to be broken off. The strengthening ribs on the upper surface are unarmed, a few long setae stand on the latter near the anterior border. The endopod, 1,12 mm. long and 0,64 mm. broad, is ovate, a little shorter than the outer swimmeret and almost twice as long as broad; a tooth of the same size as those of the exopod occurs at the distal end of the anterior margin and the rib on the upper side is armed with two teeth, also of the same size, one near the proximal, the other near the apical extremity of the rib. Both swimmerets are fringed with plumose setae; a few plain hairs occur on the apical border of the endopod, a few shorter ones also near its anterior border.

Eyestalks short, reaching to midway between the constriction of the rostrum and the median notch; the eyes that occupy half the length of the stalk, are distinctly facetted and black pigmented.

Internal antennae 2,86 mm. long, the peduncle measuring 1,2 mm., the longer, thinner flagellum 1,66 mm.; they are rather short, measuring not yet two-thirds the length of the carapace and only one-fourth the whole length of the body. The 1st joint of the peduncle, 0,7 mm. long, reaches a little beyond the eyes and is, as usual, expanded at its base; the 2nd article is 0,2 mm. long and 0,18 mm. thick, almost as long as thick and a little shorter and thicker (broader) than the 3rd joint, that is 0,3 mm. long; the 3rd joint, 0,12 mm. broad at its base, widens somewhat distally, being here 0,145 mm. broad, so that the 3rd joint is

twice as long as broad or thick. The three joints are a little setose, but quite unarmed. The outer, thicker flagellum is 1,52 mm. long and composed of 20 joints; it slightly grows thicker until at one-third its length from the extremity, i. e. until the 12th joint, which is 0,11 mm. broad and 0,07 mm. long, one and a half as broad as long; the following are also broader than long, except the 3 last ones, the terminal joint being 0,1 mm. long and 5-times as long as thick. Some of the preceding joints are also a little longer than thick, so e. g. the 5th joint that is 0,11 mm. long and 0,09 mm. thick. The inner flagellum is 1,66 mm. long and composed of 16 joints, that are all longer than thick; this flagellum is cylindrical, 0,04 mm. thick, so that the outer flagellum appears to be 2-to 3-times as thick as the inner; the 4th joint is 0,14 mm. long, the 13th 0,13 mm., the 14th and the 15th 0,12 mm., the terminal joint 0,125 mm.

The external antennae are 6,2 mm. long, almost as long as the abdomen; the peduncle is 1,5 mm. long, the flagellum which is composed of 40 joints, 4,7 mm. The outer margin of the 2nd joint (Fig. 2, 2*a*) ends in a sharp tooth, the stylocerite, that reaches as far forward as the eyes; the 4th or penultimate joint is 0,6 mm. long, 0,18 mm. thick in the middle, 0,19 mm. distally, so that it is 3-times as long as thick; the terminal joint is little more than half as long as the penultimate. The scaphocerite is well developed, triangular, acuminate and reaches as far forward as the rostrum, to the middle or a little beyond the middle of the 4th joint; viewed from above, the inner margin of the scaphocerite appears slightly concave, the outer nearly straight.

The external maxillipeds (Fig. 2*c*) are pediform and slender. Coxa armed with a small tooth on the lower margin. The ischium, 0,75 mm. long, is 0,16 mm. broad at its base and 0,22 mm. at the distal end, widening slightly forward, so that the width at the distal extremity is a little more than one-fourth its length. The merus is 0,6 mm. long, a little shorter than the preceding joint, 0,18 mm. broad proximally, 0,16 mm. distally, so that it is not yet 4-times as long as broad; the outer surface of this joint, that narrows a little distally, is armed near the lower margin with a row of four, small, sharp teeth, that slightly increase in size, so that the 1st, situated at $^1/_3$ the length of the merus from its proximal extremity, is 0,03 mm. long, the 4th at the distal end, 0,06 mm., twice as long. The two following joints have the same length, viz. 0,5 mm., the dactylus is a little shorter, viz. 0,28 mm. long and these three joints are all 3-times as long as broad. The crest on the inner surface of the ischium is armed with 17 acuminate teeth, of which 8 of equal size alternate with 9 smaller teeth that are also of equal length. The inner surface of the merus is furnished, except near the base and near the borders, with long setae, of which a few are ciliate; a tuft of plumose setae occurs on the distal end of the inner surface of the carpus and also on that of the penultimate joint; the joints are fringed with long hairs on their lower margin.

The legs of the 1st pair (Fig. 2*d*) are equal. Both the coxa and the basis carry a sharp tooth or spine at the distal end of their lower surface and two similar spines are placed on the lower border of the ischium, the anterior as far distant from the distal end as the posterior from the proximal. The merus, 1,6 mm. long, measured in the middle of its outer surface, shows its greatest width of 0,64 mm. at one-third its length from the carpal articulation, whereas it is 0,48 mm. broad at the proximal end; the greatest width is therefore two-fifths

the length. The upper border is unarmed, the lower carries five sharp teeth, that are barely smaller than those of the ischium, of equal size and equidistant; the 1st is twice as far distant from the proximal end of the lower margin than from the 2nd and the 4th is placed just there where the merus shows its greatest width. The carpus, 1 mm. long, is just half as broad on the distal margin that articulates with the chela; the upper margin is straight, the lower armed near the distal end with a sharp tooth, of the same size as those of the ischium. The chela is 1,71 mm. long, nearly as long as the merus, the palm 0,96 mm. long, 0,51 mm. broad at the articulation with the carpus and 0,64 mm. at that of the fingers. Of the latter, which measure two-thirds the length of the palm, the immobile finger (Fig. 2*e*) appears triangular, the pointed extremity is not turned upward and its lower margin is in a line with that of the palm. The immobile finger is armed just midway between the articulation and the tip with a very sharp tooth, that is directed forward and a little larger than the tooth on the carpus; between this tooth and the articulation are three and between it and the tip four much smaller teeth, the latter gradually decreasing in size distally. The dactylus tapers in a lesser degree, the pointed tip is curved down and there is but one obtuse tooth just near the tip. The lower margin of ischium, merus and chela are fringed with rather long setae, some occur also at the distal end of the lower border of the carpus; similar setae are observed in small tufts of 2 or 3 on the outer side of the chela near the lower border and on the inner surface near the upper, as also near the upper margin of the carpus, on the inner side.

The coxae of the 2nd pair carry a spine at the base of their inner margin and the lower border of the ischium is armed with 2 spines, one not far from the proximal extremity, the other a little less far distant from the distal end as from the posterior spine. The merus, 1,64 mm. long, measured along its straight, upper margin, is almost 4-times as long as broad and presents its greatest width of 0,45 mm. in the middle of its somewhat curved, lower margin. The carpus is short and stout, 0,7 mm. long and 0,45 mm. broad on the distal border that articulates with the chela. The chela is also short and stout, 0,93 mm. long, little longer than the carpus; the palm, 0,36 mm. long, is 0,54 mm. broad at the articulation of the fingers, that are one and a half as long as the palm; the cutting-edges of the fingers are straight, that of the triangular, immobile finger carries, along its whole length, about a dozen of small teeth, 6 smaller teeth are observed on the distal half of that of the dactylus. Merus, carpus and chela are unarmed, but fringed with hairs and some setae occur also on the distal border of the carpus.

The coxae of the 3rd legs carry a strong spine at the base of their inner margin posteriorly and the anterior border of their inner surface is furnished with 5 or 6 somewhat smaller spines; the other joints are all unarmed. The merus is 1,5 mm. long and 5-times as long as broad; a few hairs are inserted on its margins, especially on the slightly curved lower one. The carpus, 0,68 mm. long, is almost half as broad, viz. 0,32 mm., at the distal end; a tuft of long setae occurs on the distal end both of the upper and the lower border. The propodus is 1 mm. long and shows its greatest width of 0,33 mm. in the middle, being thus 3-times as long as broad; it narrows a little towards both extremities, the margins are fringed with hairs and near them several hairs are observed on the outer surface. The dactylus, 0,54 mm. long, is half as long as the preceding joint, a little curved at the base and tapers regularly; it is fringed with hairs.

The coxae of the 4th legs (Fig. 2*f*) carry a strong spine on their anterior border near

the articulation with the basis and 3 or 4 smaller spines occur between it and the implantation of the coxa on the body. The merus, 1,3 mm. long and 6-times as long as broad, appears a little more slender than that of the 3rd pair; the carpus, 0,8 mm. long, is 0,22 mm. broad distally, appearing also more slender than in the preceding leg; the propodus is 1 mm. long and 4-times as long as broad, being 0,24 mm. broad in the middle; on the margins of this joint that narrows somewhat towards either extremity, setae are implanted, longer ones at the distal end of the upper and on the lower margin, and the distal half of the latter is clothed with ciliated bristles. The dactylus, half as long as the propodus, resembles that of the 3rd pair, but I observed a small acute tooth on the outer side at $^1/_3$ its length from the articulation; the width at the base of the dactylus is $^1/_5$ its length.

The lateral margins of the sternal plaque, lying between the legs of the 4th and 5th pairs, end in a strong spine.

The legs of the 5th pair (Fig. 2*g*) are shorter and feebler than the preceding. The merus of these quite unarmed legs is 0,9 mm. long and 6-times as long as broad; the somewhat curved carpus is 0,6 mm. long, its greatest width, distally, 0,16 mm., is nearly $^1/_4$ its length. The slightly curved propodus, 0,94 mm. long until the articulation with the dactylus, is a little longer than the merus; it is 0,12 mm. broad in the middle and 0,14 mm. at the distal end, appearing almost 8-times as long as broad in the middle; some long setae occur at the distal end of the upper margin and the lower is furnished, except on the proximal third part, with ciliated bristles, that grow longer distally; similar bristles exist also on the distal border that articulates with the dactylus. The dactylus, 0,32 mm. long, measures about $^1/_3$ the length of the propodus; the lower border of the propodus being produced distally almost to the middle of the dactylus, this leg appears subcheliform. This process (Fig. 2*h*, 2*i*) of the propodus ends distally in one claw, perhaps two and carries posterior to them still 4 small, probably movable teeth; very strongly magnified, the lower margin of the terminal claw (or claws) did appear finely denticulate (Fig. 2*i*). In the other specimen the dactylus was less strongly curved and the propodal process (Fig. 2*j*, 2*k*) much shorter and unarmed, differences perhaps owing to the process being worn off.

Posteriorly, near the insertion of the legs of the 5th pair, the carapace carries at either side a strong, slender spine, that is slightly curved forward. First abdominal somite destitute of appendages. The appendages of the following somites are biramous, the rami foliaceous. The exopod of the 2nd pleopods is 1 mm. long, the greatest width, not far from the base, is two-fifths the length; the endopod is 1,22 mm. long, slightly longer, but narrower, the greatest width near the insertion of the stylamblys being $^1/_4$ the length. The slender stylamblys is implanted at $^1/_3$ the length of the endopod from the base; it is 0,38 mm. long, 9-times as long as thick, slightly tapering and there are a few cincinnuli on the tip. The other pleopods are also furnished with a stylamblys.

The other specimen has almost the same size, being 10,6 mm. long until the anterior end of the rostral teeth and 10,5 mm., when measured in the middle line. The carapace, measured in the middle line, appears to be 4,24 mm. long, when the rostral teeth are included, however, 4,34 mm. and the carapace is 1,2 mm. broad anteriorly; the rostrum is 0,62 mm. broad at the constriction and its greatest width, in front of it, 0,65 mm. The cervical groove is situated at $^1/_3$ the length of the carapace from its posterior extremity.

This species now shows in most characters such a striking resemblance to *Axius (Neaxius) Gundlachi* (von Martens) var. *orientalis* de Man (J. G. DE MAN, in: Mitteilungen des Zoologischen Museums zu Berlin, Bd. 12, Heft 1, 1925), that I should not be surprised when it should once prove to be a very young stage of that variety, which was collected many years ago by Dr. FINSCH at Matupi, New Pommerania, while the typical *A. (Neaxius) Gundlachi* (von Martens) is found at the West-Indies (Cuba, Curaçao). The 6 specimens (4 ♂♂, 2 ♀♀) from Matupi, described l. c., are lying before me. The largest male has a length of 68 mm., while the largest female is 56 mm. long [1]), the larger specimen of *A. euryrhynchus* measures only 11,06 mm., one-fifth the length of the larger female from Matupi. Carapace and rostrum resemble those of the female from Matupi, but the median notch of the rostrum appears in the Matupi specimens less broad, deeper than broad, in the specimens of *A. euryrhynchus* broader than deep. The upper surface of the rostrum appears in *A. Gundlachi* and its variety granulate, in *A. euryrhynchus* smooth. Like in *A. euryrhynchus* the rostrum extends almost to the distal extremity of 2nd antennular article, but while in that species the peduncle of the inner antennae reaches to the middle of the 5th or terminal joint of the antennal peduncle, it extends in the Matupi females only to the last 4th part of the penultimate or 4th joint of that peduncle. Scaphocerite and stylocerite are in the Matupi specimens just as long as in *A. euryrhynchus* and both peduncles show also the same form. The principal differences are presented by the caudal fan. In *A. Gundlachi* (von Martens) var. *orientalis* the telson appears distinctly broader than long, so e. g. in the smaller female (in the larger female the caudal fan is missing) it is 5,5 mm. long, exclusive of the median posterior spine, and 7,1 mm. broad, in *A. euryrhynchus* these numbers are in the same succession 1,28 mm. and 1,22 mm., the telson being here a little longer than broad. Likewise the caudal swimmerets are much broader in proportion to their length than in *A. euryrhynchus*; the endopod is in the latter 1,12 mm. long and 0,64 mm. broad, in the smaller female from Matupi these numbers are 5 mm. and 3,5 mm. The peraeopods resemble those of the female from Matupi, even in particulars, as e. g. the armature of the merus and other joints of the anterior legs, the prehensile edge of the immobile finger shows exactly the same teeth as in the female from Matupi. In the female specimens of *A. Gundlachi* (von Martens) var. *orientalis* the 1st abdominal somite bears two slender uniramous filaments, long about 3,5—4 mm.; it appears therefore probable that these filaments are not yet developed in the (perhaps or probably young) specimens of *A. euryrhynchus* or that they are worn off.

Further researches, the examination of young specimens of the Matupi variety, are necessary for being able to decide whether *A. euryrhynchus* should be considered as the young stage of the former or as a proper species.

3. *Axius (Eiconaxius) crista-galli* Faxon var. *indica* de Man. Pl. II, Fig. 3—3*b*.

Iconaxius crista-galli FAXON, var. *indica* J. G. DE MAN, in: Notes from the Leyden Museum, Vol. XXIX, 1907, p. 128.

Confer: *Axius crista-galli* FAXON, in: Bull. Mus. Compar. Zoology at Harvard College, XXIV, 193, 1893 and in: Memoirs Mus. Compar. Zool. at Harvard College, Vol. XVIII, Cambridge, 1895, p. 104, Pl. XXVIII, Fig. 1—1*h*.

1) The abdomen of the larger female was not complete, the length was calculated by comparing with the other female.

Stat. 267. Dec. 20. Lat. 5° 54′ S., long 132° 56′.7 E. Off the south-east coast of Great-Kei-Island. 984 m. Bottom grey mud with a brown upper layer. 1 adult female with eggs.

Excepting some slight differences, this specimen bears such a striking resemblance to *A. (Eiconaxius) crista-galli* Faxon, a species inhabiting the west coast of Central America and beautifully figured by that author, that it is described here as a variety *indica* of that species.

The female from the Arafura Sea is 30 mm. long, the carapace measuring 10,5 mm., little more than one-third the whole length. Faxon mentions 24,5 mm. as the length of the male and 10 mm. as that of the carapace, but in his figure the carapace occupies little more than $^1/_3$ the whole length, like as in our female. The rostrum (Fig. 3) that reaches to the middle of 2nd antennular article, appears a little narrower than in the Fig. 1*a* of Faxon's Report; the lateral margins run in the middle almost parallel with one another and, in the middle, the rostrum is just half as broad as it is long. The rostrum ends in a sharp tooth that is curved upward and the lateral borders are armed on the left side with 7, on the right with 6 prominent sharp teeth that increase in size from behind forward. As in the other species of this genus the lateral margins are continued as smooth, curved ridges almost to the middle of the gastric region; these ridges are little prominent, except quite posteriorly, opposite the two central carinae. The median crest, that reaches almost to the end of the rostrum, is not cut into about 7 prominent teeth, but it carries 16 small, sharp teeth, that are a little unequal, along its whole length; the median crest divides itself into two smooth, slightly arcuate, central carinae that diverge very much and that reach as far backward as the lateral ridges.

The pleura of the 3rd and 4th abdominal somites appear a little less sharp than in Faxon's figure; those of the 4th and 5th have a minute tooth at their antero-inferior angle. The posterior margin of the 6th somite (Fig. 3*a*) is finely denticulate, presenting one small tooth in the middle and 5 or 6 at either side. The telson, measured until the tip of the median tooth of the posterior border, is 4,75 mm. long and 3,9 mm. broad, appearing one-fifth longer than broad; the slightly arcuate lateral margins carry 12—14 small, sharp teeth and the nearly straight, posterior border, that is 2,4 mm. broad, bears in the middle a strong sharp tooth. The outer caudal swimmeret carries on its outer border about 30 teeth, the inner swimmeret appears more rounded posteriorly than in Faxon's figure 1*c* and carries 22 or 23 teeth.

Eyestalks reaching not yet to the middle of the rostrum, indistinctly facetted and uncoloured.

The two pairs of antennae agree with Faxon's figure 1*a*, but the 3rd joint of the antennular peduncle appears barely shorter or smaller than the 2nd joint. The internal antennae are as long as the carapace, the external one and a half as long.

Exopod of 2nd maxillipeds nearly as long as the endopod, exopod of 3rd pair reaching to the middle of the merus.

The right cheliped is the larger and agrees in general with Faxon's figure. The lower margin of the ischium carries 6 or 7 small, sharp teeth and that of the merus is also finely denticulate, presenting 16 or 18 small teeth, of which the last are a little larger than the rest. Upper border of merus and carpus ridged, entire. The ridged, upper border of the palm is very faintly denticulate along its whole length and ends in a small, sharp tooth, whereas it is entire in the american species. The distal border of the palm between the fingers

carries not one, but 2 or 3 teeth and the prominent ridge on the lower border appears on its palmar portion finely denticulate. The fingers, that leave a small hiatus between them when closed, agree with FAXON's figure, but the dactylus has but one single, small, sharp tooth near the base. Both the outer and the inner surface of the palm are granulated on the distal third and the distal border of the inner surface appears, between the fingers, finely denticulate and carries a larger tooth near the fixed finger. The smaller cheliped resembles much that of *A. (Eiconaxius) Weberi*. The strongly curved, upper border of the merus ends in a small sharp tooth, the lower edge of ischium and merus are denticulate, the 11 or 12 sharp teeth of the merus are a little larger than on the other leg and increase in size distally. The lower angle of the carpus is sharp. The fingers that shut close together, are a little longer than the palm, which is a little higher at the articulation of the fingers than it is long. The ridged and faintly denticulate upper border of the palm terminates in a small sharp tooth; the lower border of the chela is quite straight in the middle, not at all concave and the ridge along it is faintly serrulate on its palmar portion. The palm is slightly granular distally. The prehensile edge of the triangular, fixed finger is armed at its base with a sharp tooth that is directed upward and carries 20—25 small teeth along its whole length and these teeth become smaller towards the tip. The ridge near the prehensile edge is prominent.

The 2nd legs (Fig. 3*b*) resemble those of *A. (Eiconaxius) parvus* (Bate). The lower border of the ischium carries 2 or 3 small sharp teeth. The merus, 4-times as long as broad, is almost twice as long as the short carpus; the breadth of the carpus distally is two-fifth parts of its length and it is distally one and a half as thick as at the proximal extremity. The chela, barely shorter than the merus, is more than one and a half as long as the carpus and the palm is even one-third longer than the preceding joint. The chela is a little more than 4-times as long as broad and at the articulation of the fingers just as broad as at the distal end of the carpus.

The measurements are the following:

Length of the merus.	4 mm.	Length of the chela	3,7 mm.
Breadth of the merus	1 mm.	Length of the palm.	2,8 mm.
Length of the carpus	2,2 mm.	Breadth of the palm proximally	0,76 mm.
Breadth of the carpus proximally	0,56 mm.	Breadth of the palm distally .	0,85 mm.
Breadth of the carpus distally .	0,85 mm.		

The slightly deflexed fingers measure one-fourth the length of the chela.

The other legs agree with FAXON's figure.

The abdominal appendages of the 1st somite are slender, uniramous filaments, those of the following are as in the other species.

Eggs few in number, large, 2,25 mm. long, 1,9 mm. broad.

The variety *antillensis* Bouv. of this species has been insufficiently characterized. The smaller chela of the 1st pair of legs, indeed, was not described by FAXON, so that it is unknown whether, in the type specimen, there is a tubercle or a spine at the base of the immobile finger and, as regards the lateral marginal teeth of the rostrum, BOUVIER did not indicate by which characters these teeth differ from those of the type (E. L. BOUVIER, in: Compt. Rend. Acad. Sciences Paris, CXLI, 1905, p. 803).

A. (Eiconaxius) asper (Rathb.) differs from the variety *indica* de Man, described above, by the palm of the larger chela being higher in proportion to its length and by its upper border being entire.

Geographical distribution: FAXON's typical specimens were collected on the west coast of Panama at Lat. 6° 22′ 20″ N., long. 81° 52′ E. at a depth of 465 fathoms.

4. *Axius* (*Eiconaxius*) *Sibogae* de Man. Fig. 4—4*l*.

Axius (*Eiconaxius*) *Sibogae* J. G. de Man, in: Zoologische Mededeelingen uitgegeven vanwege 's Rijks Museum van Natuurlijke Historie te Leiden. 1925, Deel VIII, p. 218.

Stat. 95. June 26. Lat. 5° 43′.5 N., long. 119° 40′ E. Sulu-sea. 522 m. Stony bottom. 1 male and another specimen of unknown sex.

The two specimens of this species which is at first sight distinguished by the shape of the inner uropods, are unfortunately damaged; in the smaller specimen, the male, one of the anterior legs is missing, in the other both and in this specimen also the pleopods of the 1st and 2nd somite; it remained therefore uncertain, whether this specimen is a male or a female, because the pleopods of the two first somites are wanting. Measured in the median line the carapace of the male proves to be 4,4 mm. long, the abdomen 7 mm., whole length 11,4 mm., in the other specimen these numbers are respectively 4,7 mm., 7,5 mm. and 12,2 mm.

The rostrum (Fig. 4) of the male that will be described as the type, is little longer (0,68 mm.) than broad (0,6 mm.) at its base and reaches almost to the middle of 2nd antennular article; from the subacute, slightly upturned tip the lateral borders, on the distal half a little convex, on the proximal half slightly concave, diverge somewhat backward and present on their distal half 3 to 5 minute, subacute, dentiform prominences or serrulations that are more distinct in a lateral view (Fig. 4*a*) than when the rostrum is looked at from above. Those of the anterior pair are situated in a transverse line near the tip, but the following are placed on the right border a little more backward than on the left. In the larger specimen these minute serrulations are less distinct. The lateral edges of the rostrum are produced on the carapace as sharp ridges that diverge from one another until midway between the orbital margin and the lateral branches of the cervical groove and then they run backward, parallel with the median line until at some distance from this groove. A sharp median carina passes back from the middle of the concave surface of the rostrum to a point situated a little in front of the place where the lateral gastric carinae curve backward and inward; the median carina then bifurcates into two diverging ridges that reach as far backward as the lateral carinae; at a short distance behind the orbital margin the median carina is armed with a very small sharp tooth, directed forward. In the larger specimen the median carina carries here two small sharp teeth situated behind one another, in front of the bifurcation, (Fig. 4*b*), the posterior tooth is little farther distant from the bifurcation than from the anterior and the latter is a little smaller than the posterior tooth. The lateral edges of the front and the lateral and submedian gastric carinae are fringed with rather long plain setae, which on the carapace are arranged in tufts. Between the carinae of the bifurcation and the lateral carinae still a third ridge (Fig 4, 4*b*) occurs, that, however, is obtuse and does not reach as far backward as the lateral carinae. The upper surface of the carapace appears in a lateral view slightly convex longitudinally from the posterior

margin to there where the dorsal median carina bifurcates. At either side of the rostrum the orbital margin presents a subacute triangular prominence.

Abdomen nearly one and a half as long as the carapace, rostrum included. Of the pleura 2—5 the posterior margin makes a right angle with the lower, in the 2nd and 3rd this angle is rounded, in the 4th and 5th not; the pleura of the 2nd somite are unarmed, in those of the 3rd, 4th and 5th the lower margin makes a distinct angle with the anterior, at which angle one observes a minute sharp tooth, the pleura of the 6th somite, finally, have only an anterior and a posterior border with a sharp tooth there where they meet and this tooth is a little larger than the teeth on the preceding pleura. At either side of the median line the abdominal terga carry a tuft of setae, on the 2nd—5th near the posterior margin, on the 6th just before the middle; of the 6th tergum both the anterior and the posterior margin bear on either side a tuft of setae. The telson (Fig. 4*c*) measures $^1/_4$ the length of the abdomen and is one-third longer than broad, with the greatest width on the anterior fifth part; posterior margin rounded with small median spine. The lateral margins that slightly converge backward, are armed in the larger specimen, both on the right and the left side, with four teeth; in the younger specimen, however, there are four teeth on the left, but five on the right side, on the left side the 3rd tooth is situated immediately in front of the 4th or last, whereas in the larger specimen the 3rd tooth appears as far distant from the 4th as the 1st from the 2nd; on the right side the supernumerary 5th tooth, in the younger specimen, is placed between the 4th and the larger movable spine, which is implanted near the lateral extremities of the posterior margin. In the larger specimen, both on the right and on the left side, the distance between the 2nd and the 3rd tooth is about one and a half as long as the distance between the 1st and the 2nd or as that between the 3rd and the 4th. The two pairs of spines or teeth on the upper surface of the telson are extremely small, rudimentary and in the younger specimen the posterior pair are even wanting; at either side of the median line tufts of setae are implanted and near each tooth of the lateral margins a seta occurs.

Basal joint of uropods unarmed. Outer uropod elliptical, nearly one and a half as long as broad, with an anterior and a posterior, but no apical margin; anterior margin a little arched, armed in both specimens with 14 rather small teeth, the distances between these teeth become smaller distally, though not gradually, so that the 3 or 4 distal teeth are contiguous; posterior margin strongly curved, with a movable tooth at the apical angle, but for the rest unarmed. Different from all other *Axiidae* is the shape of the inner uropod (Fig. 4*c*), which is characterized by the denticulate anterior border projecting as a lobe beyond the posterior border, with which this lobe makes an obtuse angle. The anterior border of this uropod, that is a little more than twice as long as broad, is armed with 13 sharp teeth, of which the 6 apical ones occur on the projecting lobe (Fig. 4*d*); like on the outer swimmeret the distances between the teeth become smaller, also rather irregularly, so that the 5 or 6 teeth on the lobule are contiguous to one another. Several tufts of long setae are implanted on the strengthening midrib of the upper surface, but spines or teeth do not seem to occur on it. The posterior margin of both telson and uropods is fringed as usual with long feathered setae.

Eyes subsessile, reaching to middle of rostrum, cornea distinctly faceted, occupying nearly

the whole stalk and of a beautiful ochraceous colour. Second and third antennular articles subequal. Outer (or upper) left flagellum in the smaller specimen 3,6 mm. long, about $^1/_5$ shorter than the carapace, composed of 17 joints that, excepting the 2nd and 5th proximal ones, are all longer than thick, right outer flagellum consisting of 15 joints that are also all longer than thick; inner lower flagellum 3,9 mm. long, $^1/_9$ shorter than carapace, composed the left also of 17, the right of 16 joints, all longer than thick, excepting the 1st at the base. In the larger specimen the outer thicker flagellum is composed, both the left and the right, of 19 joints, all longer than thick and it is 4,3 mm. long, only $^1/_{12}$ shorter than the carapace; the inner, thinner flagella are incomplete.

Antennal peduncle projecting beyond that of the inner antennae by the 5th or terminal joint, stylocerite reaching just beyond the middle of 3rd antennular article, movable scaphocerite reaching almost to the distal extremity of the antennal peduncle, a short spine on the lower side of the stalk; flagella lost.

Exopod of 2nd maxillipeds (Fig. 4*e*) reaching to the middle of the carpus of the endopod, stalk reaching about to middle of merus; there is a slender foliaceous, though narrow epipod and a rudimentary gill was also observed.

Basis of outer maxillipeds (Fig. 4*f*) with a sharp spine at inner angle, ischium 3-times as long as broad in the middle, inner edge with a small spinule at $^1/_4$ the length of the joint from the base and with another of the same size just before it (Fig. 4*h*); merus as long as ischium, also 3-times as long as broad in the middle, but narrowing apically and also with two small teeth (Fig. 4*g*), of which the anterior is twice as large as the other, near one another, on the distal third of inner border; carpus and propodus of subequal length, little shorter than merus, carpus with a small spine on the upper outer border near the distal extremity; dactylus half as long as propodus. Exopod reaching almost to the distal extremity of the merus of the endopod, with a well developed flagellum.

As was already remarked above, only the male bears one of the legs of the 1st pair; this leg (Fig. 4*i*), apparently the smaller one, closely resembles the smaller cheliped of the male of *A. (Eiconaxius) consobrinus* (de Man). Ischium one and a half as broad as long, armed with a sharp tooth on the lower margin, which is preceded by two smaller teeth that rapidly decrease in size; upper margin slightly serrate; in *A. consobrinus* these teeth are missing. Lower margin of merus straight (Fig. 4*j*), terminating in a sharp tooth, between which and the ischium 3 or 4 much smaller teeth are observed; merus almost as broad at the level of the distal tooth of the lower margin as it is long and appearing therefore broader than in *A. consobrinus*; upper margin strongly arched with a small sharp tooth at the distal extremity. Carpus twice as high as long with a small sharp tooth on the lower border. Chela 4,7 mm. long, slightly longer than the carapace, presenting its greatest height (2,3 mm.) at the articulation of the fingers and appearing therefore twice as long as high; palm a little longer (2,6 mm.) than high and than the fingers, that measure horizontally 2,2 mm. Upper border of palm obtuse, not carinate, terminating distally in a small acute tooth; both the outer and the inner surface of the palm are perfectly smooth, but on the outer side a longitudinal ridge runs near the rounded lower border from the carpal articulation to the tip of the immobile finger. Immobile finger triangular, high at base as in *A. consobrinus*, with an obtuse ridge running, on the outer

surface, near the cutting-edge obliquely to the tip of the finger; for the rest the outer surface is smooth, though bearing tufts of setae near the two ridges. The oblique part of the upper edge of the immobile finger is armed on the outer side just near the cutting-edge with two small sharp teeth, placed close together, and the cutting-edge appears undulate by about a dozen low and obtuse teeth, of which 3 or 4 in the middle are a little larger than the rest; at the inner side the oblique margin, bounding the finger-cleft, carries three similar, small, sharp teeth; the prehensile surface of this finger, finally, is defined at the inner side by a feeble ridge that ends abruptly near the tip of the finger. Dactylus with two longitudinal grooves on its smooth outer surface, formed by two obtuse longitudinal ridges, of which the upper one extends from near the finger-cleft to the tip of the finger, while the lower is only developped in the middle; cutting-edge sharp, entire, excepting two small, obtuse teeth, placed close together near the finger-cleft; upper border of dactylus with a very small, sharp tooth near the base of the finger; on the grooves and near the cutting-edges tufts of setae, tips of the fingers pointed.

Merus of 2nd legs (Fig. 4*k*) a little more than 3-times as long as wide in the middle, carpus nearly half as long as the merus, chela almost one and a half as long as the carpus, when the fingers are measured horizontally, but just one and a half as long when they are measured longitudinally; in the latter case the fingers measure two-thirds the length of the palm, but, when measured in the direction of the palm, little more than half that length; fingers shutting close together, slightly turned downward, cutting-edges armed with numerous, close-set, movable, spiniform teeth; fingers setose, a few tufts of setae also on the upper and lower border of the palm.

Pleopods of 1st abdominal somite of the male uniramous, slender appendages. Of the pleopods of the four following somites the two branches are narrow foliaceous, resembling those of *A. (Eiconaxius) acutifrons* (C. Spence Bate, Report on the Challenger Macrura, Pl. V, fig. 2*q*). Of those of the 2nd somite (Fig. 4*l*) the two branches are 1,4 mm. long, the exopod 0,18 mm. broad, 7,7-times as long as broad, the other 0,16 mm. broad; just behind the middle, at a distance of 0,6 mm. from the stalk, the endopod bears two appendages, a stylamblys and the appendix masculina; stylamblys 0,43 mm. long, almost $^1/_3$ the length of the ramus, with a few cincinnuli on the tip; the appendix masculina, implanted between the branch and the stylamblys, is 0,65 mm. long, one and a half as long as the latter and reaching to near the tip of the branch; along its proximal half the appendix masculina appears as narrow as the stylamblys but the distal half is about twice as broad with 13 stiff setae, one on the tip, 8 on the inner and 4 on the outer margin. The nearest related species is probably *Axius consobrinus* (de Man).

5. *Axius (Eiconaxius) acutifrons* (Bate). Fig. 5—5*e*.

Eiconaxius acutifrons C. Spence Bate, Report on the Challenger Macrura, 1888, p. 40, Pl. V, fig. 2*d*—*q*.
Axius acutifrons W. Faxon, Bull. Mus. Compar. Zool. XXIV, 1893, p. 193.
Axius acutifrons W. Faxon, in: Memoirs Museum Compar. Zoology at Harvard College, Cambridge, 1895, p. 103, Pl. XXVIII, fig. 2.

Stat. 266. Dec. 19. Lat. 5° 56′.5 S., long. 132° 47′.7 E. South-east coast of Great-Kei-Island. 595 m. Bottom grey mud with coral and stones. 1 male from a hexactinellid sponge.

This specimen is 21,5 mm. long, the carapace measuring 7,6 mm., i. e. almost $^1/_3$ the whole length; it is apparently adult, being of the same size as the specimens collected by the Challenger.

The rostrum (Fig. 5) that reaches to the distal extremity of 1st antennular article, is triangular, with acuminate tip, little longer than broad at its base; the slightly upturned, arcuate, lateral margins are armed each with 3 or 4 sharp teeth and they are continued, like in the other species, as smooth ridges to the middle of the gastric region. The foremost inclined part of the latter is carinate in the middle line and the carina which is entire, extends a little beyond the middle of the rostrum; like in *A. (Eicon.) farreae*, this carina is not, or quite indistinctly divided posteriorly into two diverging ridges, which are on the contrary quite conspicuous in *A. (Eiconaxius) Weberi* and in that species which has been referred to *A. (Eicon.) parvus* (Bate). Cervical groove indistinct.

The rostrum agrees very well with a camera sketch of a type specimen of *Eiconaxius acutifrons* from the British Museum, that Dr. Calman has been so kind to send me. Figure 2♂ of the Challenger Report is therefore probably inaccurate, for the rostrum appears considerably narrower than in that sketch. The abdomen, not yet twice as long as the carapace, agrees with Figure 2 of the Challenger Report. The pleura of the 2nd—4th somites are acuminate, their "infero-posterior angle being produced to a sharp point", so that they are much more pointed than those of *A. (Eiconaxius) parvus* and *A. (Eiconaxius) Weberi*; those of the 5th are obtuse, of the 6th small, but sharp and on the 3rd—5th pleura the small tooth on their infero-anterior angle is distinct. The posterior margin of the 6th somite (Fig. 5*a*) is denticulate, by 6 or 7 small teeth. The telson, 3,4 mm. long, the median tooth included, and 2,32 mm. broad anteriorly, is one and a half as long as broad, being narrower than that of *A. (Eicon.) parvus*; the lateral margins, armed with 8 or 9 small sharp teeth, are nearly parallel, converging, however, more strongly quite posteriorly, so that the posterior border, which is nearly straight, is only half as broad as the telson anteriorly; the lateral teeth show a somewhat different length on the two borders of the telson and the sharp median tooth is rather large, 0,15 mm. long and as broad at its base. As regards the arrangement of the tufts of setae on the telson, this species agrees with *A. (Eicon.) Weberi* and *A. (Eicon.) parvus*. The lateral swimmerets that extend barely beyond the telson, agree with those of the other species; the outer border of the exopod is, however, armed with 14 or 15 teeth, that of the endopod with 11.

The internal antennae are nearly 9 mm. long, a little longer than the carapace, the peduncle measuring $^1/_4$ their length; the flagella are nearly of equal length, according to Spence Bate the upper should be one-fourth longer than the other. The external antennae, long 12 mm., one and a half as long as the carapace, reach almost by half the penultimate joint of their stalk beyond the antennular peduncle and agree, for the rest, with those of *A. (Eicon.) Weberi* and *A. (Eicon.) parvus*; as regards the relative length of the thorns they agree with these species and there is also a small spine at the far end of the lower border of the 3rd or antepenultimate joint of their peduncle.

The exopod of the 2nd maxillipeds is as long as the endopod, the flagellum a little longer than the peduncle.

The external maxillipeds are provided, like those of *A. (Eicon.) parvus*, with an exopod

that reaches to the middle of the merus-joint, the flagellum a little longer than the peduncle; the spine at the base of the endopod is, however, rudimentary and the ischium- and merus-joints are a little less broad, resembling more those of *A. (Eicon.) Weberi*. The crest on the inner side of the ischium is armed with 18 sharp teeth.

The left leg (Fig. 5*b*) of the 1st pair is the larger. The lower margin of the ischium carries 2 or 3 small teeth, the three borders of the merus are unarmed, excepting a minute tooth just beyond the middle of the infero-internal margin. Lower angle of carpus sharp, turned inward. The chela is $8^1/_4$ mm. long, nearly as long as the carapace; the palm, $4^1/_2$ mm. long and 4 mm. high, is little longer than the fingers and little longer than high. The upper margin is sharp, carinate and terminates at the distal end in a small sharp tooth, that is preceded by 1 or 2 smaller ones; the palm is proximally somewhat deeper (higher) than the carpus and the nearly straight, lower border is on the outer side carinate, the smooth carina extending from near the carpus to near the apex of the fixed finger. One observes both on the outer and on the inner surface a few small granules on the distal third part of the palm. The strongly compressed fingers are of equal length; the arcuate upper border of the dactylus carries a small, sharp tooth a little nearer to the articulation than to the tip: this denticle is not mentioned by Bate. The cutting-edge carries a long, truncate, compressed tooth that is slightly concave externally, near the articulation, "from which, as Mr. Spence Bate remarks, the margin continues in an unbroken wavy line to the sharp and downward curved apex." The distal border of the palm between the fingers is rounded, whereas it appears rather sharp on Fig. 2 *k. l.* of the Report on the Challenger Macrura. The fixed finger resembles that figure, but the long tooth reaches a little beyond the middle and is deeper hollowed out, so that it is divided in a larger, subacute, distal tooth and a small, little prominent tubercle near the base; between the distal tooth and the tip the cutting-edge is straight and armed with 10 microscopical teeth.

The smaller chela (Fig. 5*c*), $8^1/_4$ mm. long, is just as long as the other, but the palm, that is 3,5 mm. long and 3,4 mm. high, is much shorter than the fingers and a little less high at the finger-cleft than long; the upper margin of the palm is sharp, carinate and ends distally in a small tooth; the lower, that is slightly concave beneath the articulation of the fingers, is also ridged externally from near the carpus to near the tip of the immobile finger. As in *A. (Eicon.) Weberi*, *parvus* etc., there is a compressed lobe at the base of the oblique cutting-edge of the immobile finger, but this lobe or tooth is not sharp, but truncate (Fig. 5*d*), presenting a minute, sharp denticle at either angle of the truncate border: the truncate form of this tooth is well visible on the camera-sketch of one of the types of *Eicon. acutifrons* from the British Museum. The oblique prehensile edge of the triangular, immobile finger carries 19 or 20 microscopical teeth along its whole length and a prominent crest runs on the outer side near the prehensile edge, the finger appearing rather concave between that crest and the lower ridge; both fingers shut close together and the dactylus, which even in the middle is less broad or high than the fixed finger at its base, has a cutting-edge that is sharp, entire.

The legs of the 2nd pair (Fig. 5*e*) agree with those of *A. (Eicon.) parvus*, as is proved by the following measurements:

Length of the merus	3,2 mm.	Length of the chela	2,75 mm.
Breadth of the merus	0,74 mm.	Length of the palm	2 mm.
Length of the carpus	2 mm.	Breadth of the palm proximally.	0,52 mm.
Breadth of the carpus proximally	0,38 mm.	Breadth of the palm distally . .	0,68 mm.
Breadth of the carpus distally .	0,62 mm.		

The following legs are a little more slender than those of *A. (Eicon.) parvus*. The 1st somite of the abdomen is devoid of appendages and regarding the four following this species agrees with *A. (Eicon.) parvus*; the 2nd pleopod bears a well developed, setose, appendix masculina of a stout shape and a stylamblys which, a little longer, is only half as thick as the appendix masculina and appears much more slender.

Geographical distribution: Off Banda, lat. 4° 31′.0″ S., long. 129° 57′.20″ E. (Bate); south of Panama, lat. 6° 30′ N. long. 81° 44′ W. and lat. 6° 22′.20″ N., long. 81° 52′ W. (Faxon).

6. *Axius (Eiconaxius) consobrinus* (de Man). Fig. 6—6*d*.

Iconaxius (*Iconaxiopsis*?) *consobrinus* J. G. de Man, in: Notes from the Leyden Museum, Vol. XXIX, 1907, p. 129.

Stat. 280. January 15, 1900. Off the east point of Timor. Lat. 8° 17′.4 S., long. 127° 30′.7 E. 1224 m. Dredge brought up glossy, black, manganese nodules. 1 male and 1 egg-bearing female.

The male is 23 mm. long, the carapace measuring 8,3 mm., the abdomen 14,7 mm.; these numbers are for the female 23,5 mm., 8,5 mm. and 15 mm., the carapace measuring a little more than one-third the whole length, both in the male and in the female.

The rostrum (Fig. 6*a*) of the male that reaches almost to the middle of 2nd antennular article, is narrow, about 3-times as long as broad in the middle; the lateral margins that, converging rather little forward, end in the subacute extremity, appear entire, unarmed, though under the microscope a few small, i. e. barely prominent teeth are recognizable. The lateral margins continue about to the middle of the gastric region, curving and diverging like in other species of this genus. The median crest extends until near the tip of the rostrum and is smooth, entire; it divides into two little diverging ridges, that are rather indistinct and short, reaching not as far backward as the lateral carinae. In the female (Fig. 6) they are inconspicuous, as in *A. (Eicon.) farreae* Ortm. In the female the rostrum reaches to the distal end of 2nd antennular article, the lateral borders converge more distinctly to a more pointed extremity and the 3 or 4 small teeth on either side are more conspicuous.

Abdomen as in *A. (Eicon.) acutifrons*. The pleura of the 1st somite terminate below in a sharp angle, the infero-posterior angle of the three following is produced to a sharp point, the 5th is more obtuse, the 6th subacute; there is a small tooth, as usual, on the infero-anterior angle of the 3rd—5th pleura. The telson of the male is 3,4 mm. long and 2,35 mm. broad, one and a half as long as broad; the somewhat arcuate lateral edges, that are armed, the left with 8, the right with 10 or 11 teeth, converge a little more backward than forward, so that the somewhat convex posterior border is 1,3 mm. broad; the strong tooth in the middle is a little broader at its base than long. Anterior border of the outer caudal swimmeret with 15 teeth, that of the inner with 12. The telson of the female, that is 4 mm. long and 2,75 mm.

broad, is armed with 13 or 14 teeth on each lateral edge; the anterior border of the outer swimmeret carries 23 or 24 teeth, that of the inner 12.

The eyepeduncles of the female reach not yet to the middle of rostrum, extending until the middle of 1st antennular article; cornea faceted and of a pale yellow-green colour; in the male they reach to the middle of the rostrum and are uncoloured.

The inner antennae are as long as the carapace, the rostrum included and their peduncle measures a little more than $^1/_4$ their whole length; the outer antennae are one and a half as long and resemble those of *A. (Eicon.) acutifrons*, the spiniform scaphocerite being a little shorter than the peduncle and distinctly longer than the stylocerite; a small spinule occurs also at the distal end of the lower border of 3rd joint.

The slender exopod of the 2nd footjaws reaches to the middle of the outer margin of the penultimate joint of the endopod; the flagellum is nearly twice as long as the somewhat broadened peduncle; epipod narrow-foliaceous, with hooked setae on the edges.

The exopod of the external maxillipeds reaches almost to the middle of the merus, the flagellum slightly longer than the peduncle; there is a strong sharp spine at the inner angle of the coxa of the endopod, the epipod is narrow with hooked setae on the borders.

Both in the male and in the female the right cheliped (Fig. 6*b*) is the larger. Lower margin of the ischium of this leg (Fig. 6*c*) with 2 or 3 small teeth, that of the merus, which is one and a half as long as broad, with two sharp teeth near the distal end, preceded by 5 much smaller ones. In both chelipeds of the male and the female the arcuate, upper border of the merus ends in a microscopical, acute tooth, that is preceded at some distance by a still smaller tooth, but in the small cheliped of the male the latter tooth is missing. Lower angle of carpus obtuse, the upper border both of carpus and merus is also obtuse, but not ridged. The larger chela of the male is little shorter than the carapace and the palm, which is slightly longer than high at the articulation of the fingers, is one and a half as long as the latter. The ridged upper border of the palm ends distally in two small, sharp teeth; a prominent, entire ridge runs along the outer side of the slightly concave lower border of the chela, the distal border of the palm between the fingers is entire, but a few, 5 or 6, setose granules are scattered over the distal half, both of the outer and the inner side of the palm. The fixed finger carries one single subacute tooth of medium size, somewhat nearer to the articulation than to the tip and this tooth is preceded by a characteristic, moderately deep notch, between this tooth and the tip the prehensile edge appears finely crenulate or denticulate. When closed, the fingers leave a small hiatus between them near the articulation; the upper border of the arcuate dactylus is ridged, it carries a small rounded tooth near the articulation.

The smaller chela (Fig. 6*d*) of the male is a little shorter than the right and the palm that is somewhat higher at the articulation of the fingers than long, is a little shorter than the fingers. The upper border of the palm is ridged and ends in a small, sharp tooth, the ridge on the nearly straight, lower border is entire. There is no trace of a tooth or prominence at the base of the fixed finger and by this character *A. consobrinus* differs at first sight from the five other species of this subgenus described in this work. The fixed finger is triangular, much higher at its base than the dactylus and feebly denticulate along the whole length of its cutting-edge; except a low, rounded prominence at the base, the prehensile edge of the

dactylus appears entire; the ridge near the cutting-edge of the immobile finger is little prominent.

The chelipeds of the female agree with those of the male, but the chelae are a little less high in proportion to their length.

The 2nd legs resemble those of *A. (Eicon.) acutifrons* (Bate), but the carpus is a little longer than the palm; the measurements are, in the male, the following:

Length of the merus.	3 mm.	Length of the chela	2,55 mm.
Breadth of the merus	0,72 mm.	Length of the palm	1,8 mm.
Length of the carpus.	1,9 mm.	Breadth of the palm proximally.	0,52 mm.
Breadth of the carpus proximally	0,4 mm.	Breadth of the palm distally . .	0,62 mm.
Breadth of the carpus distally .	0,6 mm.		

The other legs resemble also those of *A. (Eicon.) acutifrons* (Bate).

Male devoid of appendages on the 1st abdominal somite, as in the other species. The 2nd pleopod of the male carries a well developed appendix masculina beset with long setae and on the outer side of it a somewhat shorter stylamblys. Eggs few in number, large as in the other species.

This species is most closely allied to *A. (Eicon.) acutifrons* (Bate) and to *A. (Eicon.) farreae* (Ortm.), but differs by the characters of the chelae of 1st legs.

7. *Axius (Eiconaxius) parvus* (Bate). Fig. 7—7*f*.

Eiconaxius parvus C. Spence Bate, Report on the Challenger Macrura, 1888, p. 44, Pl. V, fig. 4 en 5.

Stat. 262. December 18. Off the southwest coast of Great-Kei-Island. Lat. 5° 53′.8 S., long. 132° 48′.8 E. 560 m. Bottom: solid bluish grey mud, upper layer more liquid and brown mud. 1 male.

It is with great doubt that this specimen is referred to *A. (Eicon.) parvus* (Bate), a species inhabiting the Kermadec islands. Dr. Calman with his usual obligingness sent me three camera-sketches of the single type (♀), existing in the British Museum, in which, unfortunately, the 2nd legs are wanting. The figures of the rostrum and the smaller chela of 1st pair agree pretty well, but the eyepeduncles appear on the sketch a little shorter and the fingers of the larger chela present apparently a different toothing.

The male from the Kei Islands is 21,5 mm. long, the carapace (rostrum included) measuring 8 mm., the abdomen 13,5 mm. The rostrum (Fig. 7) reaches but little beyond 1st antennular article, is 1,24 mm. long and appears rather narrow; the lateral borders that are smooth and entire, run almost parallel but curve anteriorly to the subacute tip; the rostrum is a little longer than broad at its base and, at one-third its length from the tip, appears just half as broad as long. The slightly upturned, lateral margins are produced on to the carapace as smooth ridges that define the gastric region laterally, nearly to the middle of it; the foremost, inclined part of the gastric region is carinate in the middle line and this crest which is smooth and entire, extends to near the tip of the rostrum; like in *A. (Eicon.) Weberi*, it divides posteriorly into two arcuate ridges that are also smooth and that, running parallel with the lateral ridges, reach nearly as far backward as the latter. At

the posterior end of the lateral ridges, immediately inside of them, another short ridge, 0,38 mm. long, runs backward. Cervical groove inconspicuous. Carapace smooth.

The abdomen, little more than one and a half as long as the carapace, resembles that of *A. (Eicon.) Weberi*, excepting the caudal fan; as in this species, there is a small sharp tooth at the lower end of the anterior border of the 3rd—5th pleura. The telson (Fig. 7*a*), measured in the middle line and the median tooth included, proves to be 3,4 mm. long and 2,8 mm. broad, i. e. one-fourth longer than broad, being comparatively broader than the telson of *A. (Eicon.) Weberi*; the lateral margins converge a little backward and carry, the left 7, the right 9, small sharp teeth at rather unequal distances from one another. Next to the last tooth two similar small teeth occur on the posterior border (Fig. 7*b*), that is nearly straight, with a somewhat larger sharp tooth just in the middle. Like in *A. (Eicon.) Weberi* the telson carries at either side not far from the lateral edges a longitudinal row of tufts of long setae and near the middle line on either side shorter hairs. The uropods resemble those of *A. (Eicon.) Weberi* and agree with this species even as regards the number of sharp teeth on their outer border, that of the exopod carrying 21 or 22 teeth, that of the narrower inner plate 16.

Eyepeduncles reaching to the middle of the rostrum, conspicuously faceted and presenting a distinct small fleck of greyish pigment on the upper side near the inner border.

Internal antennae similar to those of *A. (Eicon.) Weberi*, as long as the carapace, the peduncle measuring one-fourth their length; the inner flagellum, composed of 19 joints, is little shorter but half as thick as the outer that is formed by 28 joints.

External antennae as in *A. (Eicon.) Weberi*.

Second maxillipeds as in this species, exopod almost as long as the endopod; those of the 3rd pair agree also with *A. (Eicon.) Weberi*, but there is a slender exopod that reaches almost to the middle of the merus, consisting of a stalk and a nearly as long flagellum. The larger cheliped (Fig. 7*c*) resembles much that of *A. (Eicon.) Weberi* (de Man), differing chiefly by the following. The lower margin of the ischium carries at the inner side 6 small teeth, of which the anterior is larger than the others, that of the merus 9 or 10 small teeth, of which the two anterior (Fig. 7*d*) are placed close to one another and a little larger than the preceding. The strongly curved, upper border of the merus is unarmed; the palm, about one and a half as long as the fingers, is a little longer than high, its upper border is obtuse, but not ridged and ends in a single, small tooth; both the outer and the inner surface of the palm are covered with rounded granules on the distal third part and on the base of the fixed finger, smaller, microscopical granules occur moreover on the rest of the outer surface, just above the middle. The fingers resemble those of *A. (Eicon.) Weberi*, but the tooth at the base of the dactylus is rudimentary and the toothing of the fixed finger differs: as in *A. (Eicon.) Weberi* this finger carries an obtuse tooth, that is directed forward, but it is placed nearer to the articulation and there are (Fig. 7*c*, 7*e*) 4 or 5 much smaller teeth situated on the distal border of the palm and separated from the larger tooth by a characteristic notch. The dactylus is a little longer than the fixed finger, both are setose as usual and also the granulated parts of the palm.

The palm of the smaller cheliped is distinctly shorter than the fingers, its upper border

is carinate; the anterior border carries just near the articulation of the fingers a strong acute tooth and both surfaces of the palm are smooth, for the rest this leg resembles that of *A. (Eicon.) Weberi.*

The 2nd legs (Fig. 7*f*) differ from those of *A. (Eicon.) Weberi.* A microscopical sharp tooth, 0,04 mm. high, occurs just behind the middle of the lower border of the ischium. The carpus is much shorter than in that species, measuring only two-thirds the merus, which is nearly 4-times as long as broad; the carpus thickens, as usually, its diameter at the distal end measures two-fifths its length, so that it is of a stouter shape. The chela, almost as long as the merus, is one and a half as long as the carpus and the carpus is even a little shorter than the palm; the palm, proximally almost as broad as the carpus, widens very little distally. The slightly deflexed fingers measure one-fourth the length of the chela. The measurements are the following:

Length of the merus	3,1 mm.	Length of the chela	2,92 mm.
Breadth of the merus	0,84 mm.	Length of the palm	2,18 mm.
Length of the carpus	1,9 mm.	Breadth of the palm proximally.	0,68 mm.
Breadth of the carpus proximally	0,42 mm.	Breadth of the palm distally . .	0,74 mm.
Breadth of the carpus distally .	0,72 mm.		

The other legs are as in *A. (Eicon.) Weberi.*

First abdominal somite without appendages. Appendix masculina with long setae on the distal half, nearly of the same size as the stylamblys.

Geographical distribution: Off the Kermadec Islands, lat. 29° 55′ S., long. 178° 14 W.

8. *Axius (Eiconaxius) Weberi* (de Man). Fig. 8—8*o*.

Iconaxius Weberi J. G. de Man, in: Notes from the Leyden Museum, Vol. XXIX, 1907, p. 127.

Stat. 266. December 19. Off the southwest coast of Great-Kei-Island. Lat. 5° 56′.5 S., long. 132° 47′.7 E. 595 m. Bottom grey mud with coral and stones. 2 males and 6 females, taken out of Hexactinellidae; of the females two are provided with eggs.

Stat. 267. December 20. Off the southeast coast of Great-Kei-Island. Lat. 5° 54′. S., long. 132° 56′.7 E. 984 m. Bottom grey mud with a brown upper layer. 1 male.

A species of medium size, belonging to those in which there is a forwardly projecting, often sharp lobe or spine at the base of the fixed finger of the smaller cheliped and distinguished by the carpus of the 2nd legs, which, barely shorter than the chela, is longer than the palm.

The largest specimens are the ova-bearing females that are 20 mm. long, the carapace measuring 6,75 mm., the abdomen 13,25 mm.; the larger male is 16 mm. long, the carapace 6 mm., the abdomen 10 mm. These numbers prove that the abdomen, in the female twice as long as the carapace, appears in the male comparatively somewhat shorter. The gastric region, a little convex longitudinally, more distinctly so in the female than in the male, slopes anteriorly obliquely down to the rostrum, like in other species of this genus. The rostrum (Fig. 8, 8*a*, 8*b*) that projects horizontally forward, reaching to the middle or almost to the middle of 2nd antennular article, is triangular, depressed, with rather obtuse tip; the rostrum appears in the male (Fig. 8) about one-fourth longer than broad, in one female very little longer, in the other

(Fig. 8*b*) even slightly shorter than broad at its base. The lateral margins are finely serrulate, presenting 8 or 9 small, subacute teeth, that are more conspicuous in a lateral aspect of the rostrum (Fig. 8*a*), than when it is looked at from above; the margins are continued as smooth, prominent and divergent ridges on to the carapace, extending along its anterior third part and defining the gastric region laterally. The foremost part of the gastric region, just behind the rostrum, is carinate in the middle line and this carina divides backward into two arcuate, divergent ridges on the anterior part of the gastric region; these ridges are also smooth and entire, like the median carina, and reach as far backward as the outer ridges, viz. the prolongations of the lateral margins of the rostrum. Cervical groove inconspicuous. Carapace smooth.

Abdominal pleura sloping obliquely down. Those of the 2nd somite are pointed, sharp, the 3rd and the 4th gradually less sharp, the 5th rounded, the 6th obtuse. The telson apparently shows a different form in the male and in the female. The telson of the larger male (Fig. 8*c*) is 2,7 mm. long and 1,72 mm. broad anteriorly, being one and a half as long as broad; it is broadest anteriorly, but the lateral edges converge backward, so that their posterior extremities are only 0,82 mm. distant. The arcuate posterior border, that ends in the middle line in an acute tooth, long 0,1 mm., appears therefore only half as broad as the width of the telson anteriorly; the lateral edges are armed, the right with 5, the left with 4 acute teeth, that are smaller than the median tooth of the posterior border; the foremost tooth is situated a little before the middle of the telson, the last at the end of the lateral margins. Small tufts of 2 or 3 long setae are arranged in four longitudinal rows on the telson, two on either side of the middle line. The uropods are as long as the telson; the elliptical exopod is a little more than one and a half as long as broad and its strongly curved, outer border carries 21 teeth, excepting the proximal third part; the endopod is less broad, its width being $^3/_4$ that of the outer plate and its outer border carries on the distal half 9 teeth. The other male agrees with the described one, but there are 6 teeth on the left and 5 on the right lateral margin. The telson (Fig. 8*d*) of the largest female is 3,4 mm. long and 2,24 mm. broad, also one and a half as long as broad. The lateral edges are less convergent, so that the posterior margin is 1,2 mm. broad, comparatively broader than in the male, the posterior margin is nearly straight and the median tooth smaller; in one ova-bearing female the lateral margins carry on the left side only 2, on the right 3 teeth, all on the posterior half, in the other ova-bearing female 4 on the left, 3 on the right. The uropods agree with those of the male. The telson of the young females resembles more that of the male. So e. g. in such a female the telson is 2,4 mm. long and 1,52 mm. broad; the posterior margin which resembles that of the male, is only half as broad as the width of the telson anteriorly; the lateral edges carry 7 teeth on the left, 6 on the right side. The outer border of the exopod carries 20 teeth, that of the inner plate 15; these teeth, the number of which is therefore somewhat variable, extend along the whole length of the plate.

Eyepeduncles very small, eyes faceted, quite pale, uncoloured. The internal antennae, that, measured from their implantation, appear to be 6,2 mm. long in the largest male and in the largest female, are nearly as long as the carapace; in the male the peduncle is a little more than $^1/_5$, in the female slightly more than $^1/_4$ the whole length of the antennae. The

outer flagellum, twice as thick as the inner, is in the male distinctly longer than it, whereas in the female they are nearly of equal length; the thicker flagellum is composed of 16—19 joints, the inner, however, of 15 or 16. The 2nd and 3rd antennular articles are of equal size, together as long as 1st joint. External antennae one and a half as long as the carapace; their peduncle projects by little more than the terminal joint beyond that of the inner antennae. Stylocerite and scaphocerite large, the former reaching almost to the distal end of the penultimate joint of the peduncle, the latter almost to that of the 5th joint; the lower border of the antepenultimate joint ends distally in a sharp spine.

The slender exopod of the 2nd maxillipeds is little shorter than the endopod and outreaches the merus-joint by a little more than $^1/_4$ its length.

The external maxillipeds reach as far forward as the antennal peduncle and are apparently destitute of an exopod; the inner border of the 1st joint or coxa ends distally in a spine and the crest on the inner surface of the ischium is composed of about 20 sharp teeth.

The chelipeds (Fig. 8*e*, 8*h*) are massive, unequal, as in the other species of this genus. Both are nearly of the same length: the larger cheliped of the largest male is 12 mm. long, just twice as long as the carapace and a little longer than the abdomen, in the largest female it is 12,5 mm. long, almost twice as long as the carapace and little shorter than the abdomen. In their general appearance the chelipeds much resemble those of *A. (Eicon.) kermadeci* (Bate), but the toothing of the fingers is different. In the larger cheliped (Fig. 8*e*) of the largest male the upper border of the ischium and the strongly curved, upper border of the stout merus, that is a little longer than broad, are entire, unarmed; in the female, however, the upper margin of the merus ends in a very small, sharp tooth and in younger individuals one observes, a little behind it, another similar tooth, so that we may conclude that in older specimens these teeth are worn off. The lower border of ischium and merus is finely serrate, that of the ischium (Fig. 8*f*) carries 3 or 4 sharp teeth, whereas that of the merus is dilated, finely and irregularly serrulate and terminates beyond the middle in one or two sharp teeth. The lower border of the short carpus carries a small sharp tooth. The chela, 6,3 mm. long in the largest male and 6,5 mm. in the largest female, is about as long as the carapace; the palm, one and a half as long as the fingers, is proximally a little higher or broader than the carpus and increases somewhat in height distally, being in the male slightly longer than high, in the female just as long as high. A smooth, prominent ridge runs along the slightly concave lower border of the chela as far as near the tip of the fixed finger and a few short setae are implanted just above it. The upper border of the palm is also ridged and carries 2 or 3 small teeth at the distal end. The outer surface of the palm appears in the male (Fig. 8*e*) slightly rugose on the upper third part, in the female it is quite smooth. The compressed fingers that are of equal length, are somewhat curved inward; when closed they leave a small hiatus between them. The fixed finger (Fig. 8*g*) carries just beyond the middle a rather obtuse conical tooth that is directed forward and between this tooth and the articulation 3, 4 or 5 smaller, obtuse teeth; between the conical tooth and the slightly upturned, rather sharp tip of the finger the cutting-edge appears entire. The strongly arcuate, upper border of the dactylus is also ridged and its sharp tip is bent downward; this finger carries a broad, though low and obtuse tooth at the base, which is larger than the conical tooth of the

immobile finger, and between this tooth and the tip the slightly undulate prehensile edge appears entire and unarmed. The dactylus is faintly furrowed just below the upper border, but the fingers are not carinate on their outer side; they are a little setose as usual.

The palm of the smaller cheliped (Fig 8*h*) is much shorter than the fingers and appears a little higher at their articulation, than it is long; the ridged upper border ends distally in a small, sharp tooth. The fingers shut close together and are slightly curved inward. Like in *A. (Eicon.) kermadeci* (Bate), *parvus* (Bate) and *spiniger* (Mac Gilchrist) one observes a somewhat compressed, simple or bicuspid, usually sharp lobe or spine at the base of the fixed finger, at the distal end of the outer surface of the palm. In the figured smaller chela of the largest male (Fig. 8*h*, 8*j*) this lobe is bicuspid, but obtuse; Fig. 8*k* represents the bicuspid, but sharp and acute lobe in an ova-bearing female. The fingers resemble those of *A. (Eicon.) acutifrons*, according to a sketch of the type that I received from Dr. Calman of the British Museum. The straight, oblique, prehensile edge of the triangular fixed finger (Fig. 8*l*) is finely serrulate, presenting 20—30 very small teeth along its whole length, though sometimes, as in the largest male, the greater number of these teeth are worn off and missing; the arcuate dactylus is a little less broad than the other finger at its base, its curved upper border is ridged and the sharp, slightly concave, prehensile edge carries 2 or 3 small, sharp teeth at its base, that are sometimes wanting at all, and appears for the rest entire. A smooth ridge runs along the somewhat concave lower border of the chela until the tip of the immobile finger and another runs near its prehensile edge; the dactylus is faintly furrowed on the upper half of its outer surface and the fingers are a little setose as usual. The other joints of this leg agree with those of the larger cheliped, there is a sharp tooth just beyond the middle of the lower border of the merus, posterior to which the border appears finely serrulate; the lower border of the ischium carries three small sharp teeth (Fig. 8*i*).

The 2nd legs (Fig. 8*m*) reach as far forward as the antennal peduncle and are characteristic of this species. The carpus, indeed, which is a little shorter than the merus, is also somewhat, though very little, shorter than the chela, but always longer than the palm; the carpus thickens a little distally and its diameter at the distal end is little more than one-fourth its length. The palm narrows slightly towards the articulation of the fingers (except very young individuals), its width near the carpal articulation is one-fifth or little more than one-fifth the whole length of the chela and the carpus is at its distal end slightly thicker or broader than the palm; the fingers that are inclined downward and, like the palm, clothed with tufts of setae, whereas their prehensile edges carry a few small teeth, measure one-fifth the length of the whole chela; in young individuals they are comparatively longer. The measurements of these legs in millimeters are the following:

	1	2	3	4	5
	♂	♀	♀	♂	♀
Length of the merus	2,2	2,3	1,2	2,7	2,4
Breadth of the merus	0,47	0,56	0,28	0,68	0,61
Length of the carpus	1,8	2	0,94	1,64	1,5
Breadth of the carpus proximally	0,28	0,3	0,16	0,31	0,28
Breadth of the carpus distally .	0,46	0,53	0,26	0,52	0,5

	1	2	3	4	5
	♂	♀	♀	♂	♀
Length of the chela.	2	2,2	1,26	2,12	2,16
Length of the palm	1,6	1,72	0,9	1,52	1,46
Breadth of the palm proximally	0,4	0,47	0,22	0,46	0,44
Breadth of the palm distally. .	0,38	0,45	0,25	0,57	0,57

N° 1—3 *A. (Eicon.) Weberi* (de Man), N° 1 ♂ long 16 mm., N° 2 ♀ long 20 mm., N° 3 ♀ long 9 mm.; N° 4 and 5 cotypes of *A. (Eicon.) farreae* (Ortm.) from the Museum of Strassburg.

Legs of 3rd and 4th pair short and stout; whereas the merus and the carpus are unarmed and almost glabrous, the propodi are furnished near their lower border with short movable spines, arranged in 5 or 6 sets of one or more each. Dactyli subspatulate and short, measuring on the 3rd pair of the largest male little more than one-third the length of the propodi; their upper border is arcuate and ends in a curved claw, behind which one observes 7 or 8 movable teeth on the distal half of the lower border; near the last tooth 2, in the largest female 5, movable spines occur on the outer surface, on which also some setae are implanted. The 5th legs show nothing remarkable; there is a tuft of setae on the distal part of the propodus and the subspatulate dactylus agrees much with that of the preceding pairs, being little longer than one-third the propodus and the distal half of the arcuate lower border being armed with 7 teeth posterior to the terminal claw; there are no spines on the outer surface.

In the male the 1st pair of abdominal appendages are wanting, those of the following pairs are biramose, the rami long, narrow and subequal, fringed with long, articulated and ciliated setae. Appendix masculina and stylamblys are implanted (Fig. 8*n*, 8*o*) at two-fifth parts of the length of the endopod from its base; appendix masculina 7-times as long as thick, carrying a few long setae on the tip and along the distal half, measuring $^1/_5$ the length of the endopod, stylamblys a little longer, 9-times as long as thick, with cincinnuli near the tip along the distal fourth; the other pleopods with a stylamblys only.

The appendages of the 1st somite of the female are slender, uniramous filaments, those of the 4 following are biramous, the rami narrow, subequal and with a stylamblys. So e. g. in the largest female the stylamblys of the 2nd pleopods is 0,7 mm. long, 11—12-times as long as thick and the cincinnuli occur on the distal third part of the stylamblys, which is implanted at one-third the length of the endopod from its base.

Eggs few in number, large, 1,5—1,6 mm. long and 1,2—1,3 mm. broad.

As Dr. Calman informs me, the 2nd legs have disappeared from the single type (♀) of *Eiconaxius parvus* Bate in the British Museum, but he adds that the shape of the rostrum is very different from that of *A. (Eicon.) Weberi*, of which two females had been sent to him for examination. *A. (Eicon.) kermadeci* (Bate) differs by the carpus of the 2nd legs being shorter than the palm, according to a camera-sketch received from Dr. Calman; the chelae of the 1st pair are apparently also different, according to his sketches, but he adds "that none of the three specimens of *Eiconaxius kermadeci* has the smaller chela at all resembling Sp. Bate's figure." The rostrum has nearly the same shape, so that *A. (Eicon.) kermadeci* is certainly a closely allied species.

A. (Eicon.) farreae (Ortm.) from Sagami Bay, Japan, concerning which I have published

some remarks and figures in my paper „Ueber neue oder wenig bekannte *Axiidae*", in: Mitteilungen des Zoologischen Museums zu Berlin, Bd. 12, Heft 1, 1925, having been enabled to examine the types preserved in the Museum of Strassburg, differs from *A. (Eicon.) Weberi* by the longer triangular rostrum, which is almost twice as long as broad at its base. It differs by the larger chela of which the fingers are as long as the palm; the distal anterior border of the palm appears on the outer side rounded and separated by a notch from the immobile finger, that carries a long obtuse tooth reaching to the middle of the prehensile edge and slightly increasing in height distally. Like in *A. Weberi* the distal or anterior border of the palm of the smaller cheliped is armed with an acute triangular tooth. The carpus of 2nd legs is 2,7-times as long as thick at the distal extremity, is little more than half as long as the merus and measures only two-thirds of the chela, being even a little shorter than the palm; the dactylus, measured, not horizontally, but from the articulation to the tip, is about half as long as the palm.

Scytoleptus Gerst.

This genus, with which the genus *Evaxius* Kingsley (J. S. Kingsley, Bulletin of the Essex Institute, Vol. XIV, 1882, p. 26) is identical, differs from all other *Axiidae* by the outer uropods being devoid of a transverse suture, by the outer antennae presenting no trace of stylocerite or scaphocerite and by the back of the carapace falling steeply to rostrum. It is probably represented only by one single species, because *Scytol. tricarinatus* (Kingsley) from Zanzibar seems to be identical with it.

1. *Scytoleptus serripes* Gerst. Fig. 9—9*h*.

Scytoleptus serripes A. Gerstaecker, Archiv f. Naturg. XXII, 1856, p. 158, Taf. VI, fig. 1—4.
Scytoleptus serripes Strahl, Monatsber. K. Acad. Wiss. Berlin 1861, p. 1055.
Scytoleptus serripes F. Hilgendorf, Monatsber. Kön. Akad. Wiss. Berlin, Nov 1878, p. 827.
Scytoleptus serripes H. Lenz, Ostafrikanische Dekapoden und Stomatopoden, Frankfurt a/M., 1905, p. 379.
Scytoleptus serripes E. L. Bouvier, Bull. Scientif. France et Belgique, 7e Série, T. XLVIII, 1915, p. 21, fig. 8 et 9 du texte.

Stat. 58. April 25th. Anchorage off Seba, Savu. Up to 27 m. Reef. 1 male and 2 egg-bearing females.
Stat. 213. Sept. 26—Oct. 26. Pulu Pasi Tanette, near the North point of Saleyer-island. Depth up to 36 m. Reef. 1 female without eggs.

The larger female from Stat. 58 is 46 mm. long, the carapace measuring 18 mm. The eggs are not very numerous, but large, 2—2,2 mm. long and a little less broad; those of the other female are a little smaller, 1,8 mm. long. Both in the male and in the female the 1st abdominal somite carries a pair of uniramous appendages. Those of the female (Fig. 9*c*, 9*d*) are rather slender, the slender protopod ending in a multiarticulate branch, formed by 13 or 14 joints and fringed with long ciliated setae; in those of the male (Fig. 9*a*, 9*b*) the stalk appears less slender and the terminal branch is shorter, apparently not articulate and much less setose. The appendages of the four following somites are biramous in both sexes, but the characters are different in the male and in the female. In the male, long 32 mm., from Stat. 58 the protopod of the 2nd pleopods (Fig. 9*e*, 9*f*) consists of two segments, the first very

short, the second broadly-oval, 2,3 mm. long and 1,44 mm. broad. The exopod, 3,3 mm. long, appears rather broad, viz. 0,56 mm., at a short distance (0,6 mm.) from the very narrow base and from here it tapers regularly to the extremity. The slightly longer endopod, that measures 3,68 mm., appears undivided for two fifth parts of its length, the ovate undivided basal part being 1,5 mm. long and 0,8 mm. broad; the rest of the endopod is slender, multiarticulate, 9- or 10-jointed and on the inner side of the tip of its undivided basal part the endopod carries a stylamblys and an appendix masculina that are coalesced at their base. The appendix masculina that is fringed with long, not ciliated hairs, is a little more than half as long as the articulated part of the endopod, measures 1,32 mm. and ends in an obtuse point; the stylamblys (Fig. 9*f*) is considerably shorter, 0,77 mm. long, glabrous and tipped with several coupling-hooks on the median side of its conical extremity. The articulated parts of endopod and exopod are fringed with long feathered setae. The pleopods of the following somites show the same form and characters, but carry only a stylamblys. One of the pleopods of the 2nd—5th somites of the female was figured by GERSTAECKER (l. c. fig. 4). In the larger female from Stat. 58 (Fig. 9*g* and 9*h*) the stalk of the 2nd pleopods is 2,5 mm. long, but only 0,85 mm. broad; the protopod appears less enlarged than in the male, being 3-times as long as broad. The exopod is a slender filament, 5,7 mm. long; the 1st joint is 1,4 mm. long, the 2nd 0,3 mm., the 3rd 0,35 mm., the 4th 0,36 mm.; while the rest of the filament does not seem to be articulated. The endopod is a trifle longer, measuring 6,25 mm.; the 3rd basal part, 1,9 mm. long, 0,33 mm. broad at the proximal, 0,48 mm. at the distal extremity, so that it is 5-times as long as broad, is undivided; on the rest of the endopod one observes first 5 subequal joints, together about as long as the stylamblys, while the remaining part is undivided, like on the exopod. The stylamblys is 1,33 mm. long (Fig. 9*h*), slender, measuring about one-third the articulate terminal branch, and 0,12 mm. thick; it is 11-times as long as thick, with several cincinnuli on the inner side of the tip. The whole appendage, excepting the stylamblys, is fringed with long setae.

Telson of the larger female from Stat. 58 9 mm. long and 5,75 mm. broad, one and a half as long as broad, upper surface arched both longitudinally and transversely. The lateral margins that show a constriction at one-fourth its length from the base and that are entire, unarmed, slightly converge to the arcuate posterior border that carries a very small acute tooth in the middle line; the upper surface bears a shallow longitudinal furrow in the middle line, the proximal 4th part excepted and the lateral borders of this groove are slightly denticulate, the foremost pair of teeth being larger than the following. At either side of the median furrow one observes, in the middle of the telson, 2 or 3 small teeth, arranged in a longitudinal row; the telson carries above a few long hairs and the posterior margin is also setose.

The caudal swimmerets, just as long as the telson, are also strongly arcuate in both directions; each carries a median carina, which on the inner uropod is minutely denticulate, on the outer, however, smooth and the outer carries still another carina on the outer side, that disappears on the middle. For the rest the uropods are smooth and show no trace of a transverse suture, their upper surface is pubescent and somewhat hairy, like also the unarmed lateral margins.

The inner antennae (of the larger female from Stat. 58) measure about two-thirds the length of the carapace; 1st article of the peduncle nearly as long as the two following together

and the filaments are nearly of equal length. The outer antennae, 21 mm. long, are a little longer than the carapace and their peduncle is 6,5 mm. long, reaching a little beyond the middle of the antennules; there is no trace neither of a movable scaphocerite nor of a stylocerite. The penultimate joint that is strongly compressed laterally and 3,8 mm. long, is 3-times as long as the last or 5th, that has a length of 1,3 mm.; the joints of the antennal peduncle are nearly glabrous, excepting a few hairs on their distal extremities.

The conical eyepeduncles are very short, barely reaching beyond the lateral tooth at the base of the rostrum, the black eyes are semiglobular. The rostrum reaches as far forward as 2nd antennular article.

The characters of carapace and abdomen are satisfactorily described by GERSTAECKER.

In all the specimens the right leg of the 1st pair is the larger. In the adult female from Stat. 58 the larger chela is 15 mm. long, the palm 11 mm. long and 7,75 mm. high in the middle; this leg is everywhere unarmed, smooth and shining, though finely punctate. The chela, however, appears under a lens slightly rugose on the outer surface near the rounded upper and lower margins and at the base of the immobile finger the punctation is somewhat coarser. The lower border of the palm is smooth, but that of the fixed finger is somewhat granular on its proximal half; the pointed fingers, that are smooth and shining, cross one another.

The left leg (Fig. 9) has a quite different form, it is also everywhere unarmed; in the male, however, long 32 mm., I observe a very small tooth-like prominence near the distal end of the sharp lower margin of the merus; this prominence, wanting in the females, may be accidental. The distinctly arcuate, upper border of the merus is also sharp and carinate. The obtuse, upper border of the carpus is 3,7 mm. long and this joint is 2,12 mm. high at the distal end. The slender chela is 11,5 mm. long, the palm, 8,25 mm. long and 2,4 mm. high in the middle and distally, appears almost 3,5-times as long as high; the upper and the lower border of the palm, that are obtuse and rounded, run parallel with one another and the palm appears therefore just as high at the carpal articulation as at that of the fingers. The fingers that shut close together and that are almost half as long as the palm, are slightly turned downward and their pointed, sowewhat arcuate tips cross one another; the cutting-edge of the dactylus is sharp, entire, but that of the immobile finger carries 4 or 5 small teeth on its distal half, these teeth, however, are much worn off in the adult female. Both fingers, smooth and shining like the whole leg, bear a longitudinal furrow on their outer side and a few small tufts of setae. The smooth, outer side of the palm is finely punctate, some larger puncta being situated in a longitudinal row near the upper and near the lower border. Both legs of 1st pair are everywhere glabrous.

The legs of the 2nd pair are equal and strongly compressed, their joints are smooth and shining, everywhere unarmed. The merus, the upper border of which is sharp, is a little more than 3-times as long as broad. The outer side of the carpus, that is still a little longer than the chela, appears distinctly concave just below the sharp upper margin, as is also the case with the carpal joints of the two following pairs; the carpus appears almost 3-times as long as high. The fingers that shut close together, are just as long as the palm and these legs are fringed with long setae along their lower margin.

The legs of the 3rd and 4th pairs are almost glabrous, one observes, however, a tuft

of setae on the inner side of the propodus of the 4th pair near the distal extremity. The legs of the 5th pair, finally, are shorter and more slender than the preceding. They are subcheliform, because the slender propodus is produced into a short immobile finger, about half as long as the arcuate flattened dactylus; the immobile finger is concealed by a tuft of setae at the distal end of the outer side of the propodus. For the rest this leg appears also smooth and shining.

The palm of the larger chela has a pale olive-green colour, somewhat darker near the articulation of the fingers and one observes a very dark spot near the base of the dactylus; the preceding joints have the same colour, though very pale. The fingers are pale reddish with white tips. The palm of the slender left leg is dark coffee-brown, this colour becoming gradually lighter on the carpus and following joints, the fingers are snowwhite. The following legs are ochraceous, paler on their three proximal joints and on the base of their merus, the fingers of the 2nd pair and the dactyli of the three following are white, the bristles on the propodi and dactyli of the 3rd and 4th pair, finally, are black.

The younger female with eggs from Stat. 58 is 40 mm. long, that from Stat. 213 measures 36 mm.

Evaxius tricarinatus Kingsley from Zanzibar is very probably identical with this species (J. S. Kingsley, Bulletin Essex Institute, Vol. XIV, Salem, 1882, p. 26, Pl. I, fig. 1). According to this description the anterior margin of the carapace should be smooth and unarmed, in all the specimens of *Scytol. serripes*, however, a small acute tooth occurs at either side of the base of the rostrum; this tooth, of which no trace is visible in Kingsley's figure, continues backward into a short carina that demarcates the gastric region from the antero-lateral part of the carapace.

September 16th 1905 I have examined a male specimen of *Scytol. serripes* Gerst., that was kindly sent me by the Direction of the Zoological Museum at Berlin. This specimen, collected by Mr. W. Peters at Moçambique and mentioned as N° 1135 by Dr. Hilgendorf in his quoted paper of 1878, was 39 mm. long from tip of rostrum to end of telson; the larger cheliped was on the left side. It did agree quite well with the specimens collected by the „Siboga". In the young male from Stat. 58 the median carina of the gastric region, that ends distally in a sharp spine, carries behind it a subacute small tubercle, situated almost 3-times as far from the cervical groove as from the distal spine; in the female specimens, collected by the "Siboga", this small tubercle is more obtuse, but in the male from Moçambique it was almost imperceptible. The small acute denticle, situated in the middle line between the spine at the distal extremity of the median carina and the rostrum, is situated in the "Siboga" specimens a little closer by that spine than in the male from Moçambique; the rostrum of this male was sharper ,and longer, but in the "Siboga" specimens it is apparently worn off.

The larger chela on the left side was 17,5 mm. long, the palm 12 mm. long and 8,8 mm. broad near the carpus where it did show the greatest height. The lower border of the chela was distinctly granulate below the finger-cleft and the granulation reached to the middle of the immobile finger and of the palm. I did also observe a few granules and rugosities on the slightly concave outer side of the base of the fixed finger, just below the finger-cleft, and also a few very small ones on the inner side. In the female specimens, collected by the "Siboga", there are but a few granules at the base of the lower border of the immobile finger,

but this granulation is not continued on to the lower border of the palm and the outer side of the fixed finger appears a little punctate on its slightly concave basal part, but for the rest smooth, not granulate.

The Berlin specimen was got quite pale, excepting the fingers of the larger chela of a pale flesh colour with white tips; the palm of the smaller chela was of a very light red colour, the fingers dark red with white tips. The smaller chela was 14 mm. long, the palm 9,5 mm. long, 3 mm. broad proximally and distally, 2,9 mm. broad in the middle. The palm was thus 3-times as long as broad or but little longer and twice as long as the fingers. Measured along the upper border, the carpus proved to be 4,3 mm. long and distally 2,8 mm. broad. In the "Siboga" specimens the fingers of the smaller chela are quite white, the palm dark red brown, so that we may consider them as an indian variety: Dr. HILGENDORF (l. c. 1878) indeed remarks that in a male from Luzon the palm of the smaller chela was of a deep yellow colour (evidently got pale) and the "Fingerspitzen" white ("Fingerspitzen" = fingers, while those of the specimen from Moçambique are said to be of a rather deep red).

Geographical distribution: South-Africa, probably Port Natal (GERSTAECKER); Moçambique (STRAHL, HILGENDORF); Aldabra (LENZ); Madagascar (A. MILNE EDWARDS); Mauritius (BOUVIER).

Meticonaxius de Man. [1])

Meticonaxius, J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. IX, Afl. 3 and 4, 1905, p. 592.

Carapace about half as long as abdomen, branchial regions somewhat swollen. Rostrum triangular, of good size, its margins unarmed, carinate in the middle line and continuous with the gastric region, which is rounded, like also the rest of the carapace. Cervical groove indistinct. Carapace excavate posteriorly. Pleura of the abdominal somites that barely overlap one another, small. Telson quadrate, truncate; caudal swimmerets broadly foliaceous, exopod not divided by any suture. Eyepeduncles subcylindrical, rounded, eyes not faceted, faintly pigmented.

Antennular flagella subequal, longer than the peduncle, half as long as the carapace. Antennal thorns well developed, stylocerite small, scaphocerite large, spiniform.

Second maxillipeds with exopod, those of the 3rd pair pediform, without exopod.

Thoracic legs of 1st pair equal, larger than those of the 2nd. Propodi of 3rd and 4th legs compressed, oval, fringed with hairs, shorter than the carpus; dactylus shorter than the propodus, tapering. Legs of the 5th pair subcheliform.

Abdominal appendages of 1st somite in the female slender, uniramous, short. Those of the 4 following pairs biramous, the rami foliaceous, exopod broader and shorter than the endopod that is provided with a stylamblys.

This very interesting genus differs from all other Axiidae by the propodi of the 3rd and 4th legs being compressed, oval, fringed with hairs and shorter than the carpus. As regards the genus *Axius* Leach it differs moreover from the subgenera *Axius* s. s. and *Neaxius* Borr. by the rostrum being not denticulate, from the subgenus *Paraxius* Bate by the well developed antennal thorns, while the subgenera *Eiconaxius* and *Iconaxiopsis*, in which the eyes are also

1) From *μετά, εἰκών* and Axius.

feebly pigmented, show a quite different outer appearance. *Axiopsis* Borr., *Calocaris* Bell and *Oxyrhynchaxius* Parisi differ at first sight by the suture on the exopod of the last limb. It is to the genus *Meticonaxius* that perhaps will once prove to belong *Axius longispina* Stebbing, of which one specimen was taken in a depth of 52 fathoms at Cape Morgan, South Africa, N. N. W. 7 miles (TH. R. R. STEBBING, in: Annals South African Museum, Vol. XVII, 1920, p. 265, Plates CVI B and CVII). This species, indeed, fully agrees with *Met. monodon* as regards the characteristic shape of the propodi of the 3rd and 4th legs and both species also in other characters much resemble one another. According to my description of 1905 the third maxillipeds should be devoid of an exopod, which in *A. longispina* is well developed. One of the two maxillae of the 2nd pair of the type of *Metic. monodon* is still preserved, lying detached in the tube; the vibratory lamina does not bear a spine, but such a spine may be broken off during the examination. The type is in such a bad condition that I was unable to ascertain whether the 6th abdominal somite has a median carina or not, therefore the absence of an exopod on the 3rd maxillipeds appears to me rather doubtful. STEBBING's species may, however, easily be distinguished from *Metic. monodon* by the different shape of telson and uropods, the telson is moreover comparatively shorter in proportion to the length of the 6th somite than that of *Metic. monodon*. The rostrum of *Axius longispina* is described as short and blunt, while in *Metic. monodon* it is sharply pointed and just reaches beyond 1st antennular article.

The examination of other specimens of *Metic. monodon* is necessary to settle this question.

1. *Meticonaxius monodon* de Man. Fig. 10—10*t*.

Meticonaxius monodon J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. IX, Afl. 3 and 4, 1905, p. 593.

Stat. 5. March 10. Off the north-east point of Java. Lat. 7° 46′ S., long. 114° 30′.5 E. 330 m. Bottom mud. 1 female.

Body 23 mm. long, carapace 8 mm., the rostrum included. The carapace that measures about one-third the whole length, has the branchial regions rather much swollen, so that it appears here twice as thick as anteriorly; its surface is smooth. The rostrum (Fig. 10, 10*a*) is triangular, pointed and reaches just beyond 1st antennular article; it is 1,3 mm. long, one-sixth the length of the carapace, and 0,9 mm. broad at its base, so that the rostrum appears one and a half as long as broad. The upper surface is continuous with the gastric region, being situated nearly in the same level; it is carinate in the middle line, the rather sharp carina reaches anteriorly to the tip but does not extend on to the gastric region; at either side of the carina the upper surface appears a little concave. The lateral borders are straight and entire, rather sharp and unarmed; there is a very small tooth on the left lateral border just near the tip, but this tooth is, no doubt, abnormal. The lateral borders are continued in the same direction as sharp ridges on to the gastric region for a short distance, this distance being a little shorter than the lateral borders of the rostrum themselves; near these lateral carinae are inserted, on the outer side, 6 or 7 short setae, a few occur also on the rostrum itself near the lateral margins or near the median carina. Cervical groove indistinct. Anterior border of carapace unarmed, the angle that it makes on the outer side of the eyepeduncle, is obtuse.

Abdomen almost twice as long as the carapace. The 1st somite is saddle-shaped, the

2nd, which is 2,8 mm. long, is one and a half as long as the 3rd, whereas the 3rd, 4th and 5th are subequal, the 4th being a little shorter than the 3rd and the 3rd a little shorter than the 5th; the 2nd—5th somites are as broad or a little broader than the carapace. The 6th somite, that is a little shorter than the 2nd, is quadrate, as broad as long and less broad than the preceding. Pleura of moderate size and unarmed. Those of the 1st somite are obtuse, those of the 2nd are rounded anteriorly and posteriorly and the lower edge of the 3rd—5th pleura is convex and curves more or less regularly into the posterior. The abdomen is hairy, the arrangement of the hairs is characteristic. The pleura of the 1st somite carry a row of 7 or 8 plumose setae, at some distance from their anterior margin and parallel with it; each seta is implanted in the middle of a circular, circumvallated pit. The anterior border of the pleura is fringed with feathered setae on its upper part. A few setae stand on the convex, posterior part of the 1st tergum on each side of the middle line. The tergum of the 2nd somite carries also some ciliated setae, in small tufts of 2 to 5, a row of setae runs parallel with the posterior margin on each side of the middle line; another row of hairs occurs on the pleura, not far from the rounded, posterior margin and the latter carries a tuft of plumose, silk-like hairs. The terga of the three following somites are clothed rather thickly with plumose, flexible, silk-like hairs, arranged in short transverse rows or irregularly and each hair is implanted in a circumvallated pit, but these pits are smaller than those of the oblique row on the pleura of the 1st somite. The lower and the posterior part of the pleura of the 3rd—5th somites are clothed with similar hairs, the anterior part is glabrous, excepting a transverse row of similar hairs, parallel with their anterior margin: all these hairs stand in circumvallated pits. The 6th somite bears two parallel rows of plumose setae, parallel with the posterior margin and another row of ciliated hairs runs near the lateral margin of this somite, whereas a few long setae arranged in tufts of 4 or 5 occur on the tergum on either side of the middle line; some long hairs, almost as long as the telson, are implanted at the postero-lateral angles.

The telson (Fig. 10*b*) is 2,3 mm. long, a little shorter than the 6th somite and it presents its greatest breadth nearly at one-third its length from the anterior border; the telson is here also 2,3 mm. broad, so that it appears just as long as broad. The lateral margins converge a little and curve into the posterior border, that is slightly concave in the middle; as well the lateral margins as the posterior border are quite unarmed and there are no spinules on the upper surface. At one-fourth of its length from the anterior border the upper surface carries a transverse row of 6—8 long setae in the middle, the longest of which reach beyond the posterior border; 3 or 4 shorter setae occur on the posterior half, on each side, arranged symmetrically. The posterior margin is fringed with plumose setae, that, short in the middle, grow longer laterally and are continued along the lateral margins; on each side of the middle the posterior margin carries, as in other species, long plain setae, of which the longest measure 1,8 mm.

Caudal swimmerets, when directed backward, a little longer than the telson; basal joint unarmed. Of the uropods that are broadly foliaceous, the larger outer one is triangular, 2,5 mm. long and 2,05 mm. broad, distally, being thus a little longer than broad; the anterior border is slightly concave at the base and makes an obtuse rounded angle with the slightly curved, apical border, that curves into the inner. The margins are fringed with long, plumose hairs and the apical border carries along its whole length spiniform bristles that are

shorter and of rather unequal length. Except a small hooked tooth, situated just near the middle of the basal joint, the upper surface with the two strengthening ribs is unarmed; the anterior rib extends along two-thirds the exopod, whereas the posterior is barely half as long. The inner uropod, also triangular, is 2,2 mm. long, measured along its anterior border and 1,52 mm. broad, the length being in proportion to the breadth as 4 : 3; the nearly straight, anterior border makes an obtuse angle with the posterior or apical that regularly curves into the inner. The borders are fringed with plumose setae and the apical border is beset with spiniform bristles similar to those of the exopod; the upper surface carries a tuft of long setae near the anterior border at one-third its length from the base and two couples of setae are inserted behind one another on the distal third part of the hardly recognizable rib, somewhat nearer to the inner than to the anterior border.

The eyepeduncles, 0,8 mm. long, reach a little beyond the middle of the rostrum; they are cylindrical, though somewhat thickened in the middle, rounded at the tip. The eyes, occupying the distal 4th part of the stalk, are not faceted and of a rusty or ochre-yellow colour.

The internal antennae are 5,9 mm. long, measuring three-fourths the length of the carapace, the peduncle is 2 mm., the flagella nearly twice as long. The 1st joint of the peduncle, 1 mm. long, is a little expanded for two-thirds its length and the outer border is fringed with short hairs; the 2nd article is 0,5 mm. long, 0,36 mm. thick, almost one and a half as long as thick; 3rd as long as 2nd, but only 0,3 mm. thick, in a dorsal view; all the joints are unarmed. Of the flagella, that are cylindrical and of equal length, the outer, upper is composed of 17 joints and it is 0,2—0,22 mm. thick in the middle; excepting the very short 1st joint, all are more or less longer than thick: so e. g. the 2nd joint is 0,26 mm. long, 0,18 mm. thick; the 4th just as thick, but only 0,2 mm. long; the 8th 0,21 mm. long and 0,2 mm. thick; the 11th 0,4 mm. long and just half as thick; the 14th 0,24 mm. long and 0,14 mm. thick, the penultimate 0,09 mm. long, 0,08 mm. thick, the terminal joint, finally, 0,18 mm. long, 0,04 mm. thick at its base, 4-times as long as thick and somewhat tapering. The other flagellum consists of 13 joints and is 0,16 mm. thick in the middle, thus a little less thick than the outer; the 1st joint is very short, the following are all longer than thick and, excepting the 4 last joints, all more slender than the joints of the outer flagellum. So e. g. the 5th joint is 0,42 mm. long, 0,16 mm. thick at the distal end, the 7th is 0,48 mm. long, also 0,16 mm. thick distally, the 9th is 0,46 mm. long, 0,18 mm. thick distally, the penultimate 0,1 mm. long, 0,08 mm. thick, the last joint 0,11 mm. long and 0,05 mm. thick at its base. The joints of both flagella carry a few setae, some of which are ciliate, at their distal extremity and the 14th—16th joints of the outer flagellum are provided with olfactory hairs.

The external antennae are 13,2 mm. long, more than one and a half as long as the carapace and more than twice as long as the inner. The slender peduncle, 2,9 mm. long, reaches by its terminal joint beyond the antennular peduncle. Just behind the insertion of the 1st joint of the peduncle, the carapace carries a small sharp tooth or tubercle. The 1st joint is strongly convex below. The upper, sharp, concave margin of the 2nd that reaches as far forward as the eyepeduncles, ends in a short, sharp spine, the stylocerite, that extends not farther than midway between the tip of the eyepeduncles and the distal end of 1st antennular article, barely beyond the base of the penultimate joint. The lower border of the 3rd joint

terminates in a short sharp tooth at the distal extremity. The 4th joint is 1,22 mm. long, slender, laterally compressed like the 2nd, and appears, viewed at from above, in the middle somewhat less broad than at both extremities; in a lateral view it shows along its whole length the same breadth, viz. 0,25 mm, appearing then 5-times as long as broad. In a dorsal view the 4th joint appears 0,17 mm. broad in the middle, i. e. $^1/_7$ of its length and 0,24 mm. at the distal extremity; some setae occur at the distal extremity of this joint, the longest of which reach beyond the last joint of the peduncle. The scaphocerite is large, spiniform, acuminate and rather narrow; in a dorsal view it appears to be 1 mm. long and 0,18 mm. broad at its base, it narrows, however, rapidly, appearing therefore in the middle only half as broad. The scaphocerite, about 4-times as long as the stylocerite, reaches to the distal extremity of 2nd antennular article, extending along two-thirds of the penultimate joint. The last joint, 0,4 mm. long, measures one-third the penultimate and thickens slightly distally. The flagellum is composed of 40 or 41 joints, the first are a little longer than thick, but on the distal half several are slender, some being here 0,4 mm. long and 5-times as long as thick; the terminal joint is 0,26 mm. long, tapering, 0,06 mm. thick at its base and with a tuft of setae on the tip, the longest of which are 1 mm. long.

Second maxillipeds (Fig. 10*c*) with an exopod, that is nearly half as long as the endopod, the last joint of the latter is represented in Fig 10*d*. The maxillipeds of the 3rd pair (Fig. 10*e*), that just reach beyond the antennal peduncles, are pediform, slender and devoid of an exopod (Confer p. 54). The ischium, 1,28 mm. long, 0,45 mm. broad in the middle and 0,48 mm. at the distal border, that articulates with the merus, appears about 3-times as long as broad and widens a little from the proximal to the distal extremity; the outer border is very slightly concave, the inner fringed with long setae, 1,5 mm. long. The merus, 1,3 mm. long, appears as long as the ischium and is 0,475 mm. broad in the middle, being not yet 3-times as long as broad; outer border entire, inner armed with a strong, sharp tooth, long 0,25 mm. and 0,1 mm. broad at its base, at one-third its length from the distal extremity and beyond this tooth the merus gradually narrows to the latter; between the tooth that is directed forward and the ischium the inner border is fringed with similar long setae as occur on the latter. The carpus is just as long as the merus, 0,5 mm. thick distally, $2^1/_2$-times as long as thick; the penultimate joint is 1,04 mm. long, a little shorter than the carpus and shows its greatest width of 0,44 mm. not far from the carpal articulation, narrowing somewhat towards the distal extremity which is 0,34 mm. broad; the dactylus is 0,56 mm. long, 0,26 mm. thick in the middle, somewhat more than twice as long as thick and obtuse. The three last joints are also fringed with long hairs on their lower margin, the dactylus also at the tip. The denticulated crest on the inner side of the ischium runs close by the inner margin and carries 10 or 11 subacute, rather short teeth, nearly all of the same size, excepting 3 or 4 near the base; one observes also on the inner side of the basis 2 and on that of the coxa 4 or 5 smaller teeth. The inner side of the merus is clothed with long ciliated hairs somewhat nearer to the inner than to the outer border, similar hairs occur also on the inner surface near the outer border of ischium, carpus and propodus, the two last named joints are moreover clothed each with a tuft of bipinnate bristles on their inner surface and similar bristles occur also on the lower border of propodus and dactylus.

Legs of 1st pair (Fig. 10*f*) of moderate size and equal; they are 12 mm. long, one and a half as long as the carapace. The concave, inner margin of the coxa carries a small tooth both at the proximal and at the distal extremity, but the lower border of the following joint, the basis, is armed with a stronger spine near the distal end and this joint carries also a smaller spinule on its inner surface. Ischium compressed, as long as broad, unarmed. The likewise compressed merus has a stout shape: being 3,1 mm. long and 1,6 mm. broad, exclusive of the tooth, it appears half as broad as long. The sharp, upper border that is strongly curved, is unarmed, but the straight, lower margin of the inner surface carries, immediately beyond the middle, a sharp tooth; this tooth, the length of which is almost one-fifth the breadth of the merus, is placed perpendicularly to the lower margin, which like that of the two preceding joints is provided with some hairs. The carpus is 1,64 mm. long and 1,3 mm. broad on the distal border which articulates with the chela, being thus one-fourth longer than broad; the upper border is nearly straight, the lower curved. The chela is 5,5 mm. long, measured until the tip of the immobile finger; the palm is 2,9 mm. long and 1,6 mm. broad in the middle, a little longer than the fingers and almost twice as long as broad. Palm unarmed, the slender fingers strongly compressed. The immobile finger that regularly narrows and the slender pointed tip of which is slightly curved upward, is armed just in the middle with one single, sharp, characteristic tooth, from which the specific name is derived. This tooth (Fig. 10*h*), compressed like the finger itself, is nearly as high as the finger is broad (or high) at this place; it is slightly curved, so that its distal margin appears convex, the proximal concave; between this tooth and the articulation the cutting-edge runs somewhat uneven, though not dentate. The outer side of this finger is distinctly ridged near the lower border. The dactylus that regularly tapers to the slender pointed tip, is more strongly curved than the immobile finger, its cutting-edge is quite entire and unarmed, though appearing under the microscope very slightly uneven; both the outer and the inner side of the dactylus carry 3 or 4 tufts of setae and one tuft is implanted just below the strong tooth on the outer side of the fixed finger. Tufts of setae are observed near the lower border of palm and fixed finger, a few also on the outer surface of the palm near the articulation of the fingers.

The joints of the 2nd legs (Fig. 10*i*) that apparently resemble those of *Axius stirhynchus*, are all unarmed. The merus, 3,4 mm. long and 0,92 mm. broad, is almost 4-times as long as broad and its lower border is fringed with long plain hairs, that are 2,4 mm. long. The carpus, 1,9 mm. long and 0,88 mm. thick at the distal end, is twice as long as thick and a little more than half as long as the merus; its lower border is fringed with long hairs distally that measure 2,5 mm. and one observes a transverse row of long setae close by and parallel with the articulation of the hand; whereas the upper margin is also a little hairy. The chela is just as long as the carpus and twice as long as broad; the fingers, 1,25 mm. long, are almost twice as long as the palm and taper regularly to their tips. Their straight cutting-edges (Fig. 10*j*) shut close together; that of the fixed finger is, along its whole length, armed with 13 movable teeth and 9 similar teeth occur along the two distal thirds of the cutting-edge of the dactylus. The lower border of this chela and the upper border of the dactylus are fringed with setae that decrease in length to the tips, a transverse row of long setae occurs on the outer surface of the palm close by and parallel with the finger-cleft and a

small transverse tuft of 4 setae occurs on the middle of the palm near the carpal articulation; the fingers are moreover hairy on their outer surface.

The 3rd legs (Fig. 10*k*) are also unarmed. The merus is 3,25 mm. long and shows its greatest width of 0,72 mm. a little beyond the middle, being 4,5-times as long as broad; the lower border of this joint that narrows somewhat towards the proximal extremity, carries a few setae and a tuft of longer hairs, that measure 0,6 mm., occurs at the far end of the somewhat curved upper margin. The carpus is 1,6 mm. long, half as long as the merus and 0,67 mm. thick at the distal end, being here one and a half as thick as at the proximal extremity; a tuft of setae, long 1 mm., occurs at the distal end of the upper border and a tuft of shorter setae at that of the lower. The characteristic propodus is compressed, oval, 1,22 mm. long (measured in the middle) and in one leg 0,96 mm., in the other that is figured, 0,9 mm. broad, so that it is one-fourth longer than broad; the regularly arcuate, lower border is fringed, excepting a short distance near the proximal extremity, with setae that are 1,5 mm. long. The upper border appears proximally slightly concave along two fifth parts of its length, being here devoid of setae, but the curved rest of the border carries as long hairs as the lower; the distal border with which the dactylus articulates, is slightly concave. The outer surface of the propodus carries, both above and below the middle line, several small tufts of setae, but the inner side is glabrous. The conical dactylus is 0,75 mm. long and 0,25 mm. thick at the base, i. e. $^1/_3$ its length; it measures three fifths of the propodus and its borders are fringed with some short setae.

The coxae of the 4th legs carry a small spine, that is curved outward, on their rounded and somewhat setose, anterior border. The merus is 3 mm. long and 5-times as long as thick; the carpus is 1,8 mm. long and thickens somewhat distally, where it is 0,54 mm. thick, about $^1/_3$ its length. The propodus (Fig. 10*l*), which is 1,55 mm. long and 0,8 mm. broad, much resembles that of the 3rd legs, but it is a little longer in proportion to the carpus and it is less widened, the breadth in proportion to the length being only two-thirds that of the 3rd legs. The borders resemble those of the propodi of the 3rd legs and the arrangement of the tufts of setae is also the same: the longest at the distal end of the upper border measure 1,2—1,3 mm. The lower border carries, besides the other hairs, at the distal end two strong bristles (Fig. 10*m*) or spines that are but little shorter than the dactylus, measuring 0,5—0,6 mm. and that are bipinnate, being furnished on either side with subacute teeth; posterior to them the distal half of the lower border carries several other bipinnate bristles (Fig. 10*n*), on which the teeth at each side are much smaller and more numerous. The outer surface is covered, like the propodi of the 3rd legs, with setae, mostly arranged in small tufts and partly ciliate, there are moreover near the proximal extremity of the upper border 5 short plumose setae arranged in an oblique row. The conical dactylus is 0,72 mm. long, half as long as the propodus and 0,21 mm. thick at the base, about $^1/_3$ its length; on the distal half of both margins some short setae occur and there are 5 or 6 movable spines or bristles near the middle of the upper border.

Legs of the 5th pair (Fig. 10*o*) subcheliform. Only one is present and, the leg being broken off near the ischium, the length of the merus that is 0,44 mm. thick in the middle, could not be measured; but for a few short setae on the upper border, the merus appears

glabrous. The carpus, 1,25 mm. long, is 0,52 mm. thick at $^1/_8$ its length from the distal extremity, $2^1/_2$-times as long as thick; the upper border is strongly curved and a tuft of setae occurs near the articulation with the propodus. The following joint is 2,2 mm. long until the tip of the fixed finger and 1,9 mm. until the articulation of the dactylus; it is 0,41 mm. broad in the middle and broadens a little towards the distal end, appearing thus 5-times as long as broad. The curved dactylus is 0,7 mm. long, a little longer than the immobile finger and 3-times as long as thick; the cutting-edge is armed with small, movable teeth. A tuft of long hairs, the longest of which measure 1,2 mm. and extend beyond the dactylus, occurs at the far end of the upper border of the propodus; the distal end of the outer surface is clothed with stiff, ciliate bristles, of which the ciliae are very short and numerous and these bristles (Fig. 10*p*, 10*q*) occur along the distal half of the lower border, whereas the longest, near the articulation, are slightly curved and reach beyond the dactylus. The distal extremity of the inner surface of the propodus and the curved, upper border of the dactylus are also furnished with long hairs.

The sternal plaque that is unarmed, is deeply grooved in the middle line of its posterior half and presents posteriorly, on each side of it, a rounded lobe.

The 1st abdominal somite carries a pair of short, moderately slender, uniramous, rudimentary appendages, only 0,65 mm. long. The pleopods (Fig. 10*r*) of the 4 following somites are large, biramous and each carries a slender stylamblys; the two rami are foliaceous, fringed with long feathered setae and implanted on a rather short peduncle. The exopod is earshaped, longer than broad, obtuse, the inner margin straight, the outer somewhat curved; the endopod is oval, somewhat longer but less broad and the stylamblys is implanted a little nearer to the base than to the tip. So e.g. the exopod of the 3rd pleopods is 2,1 mm. long and 1,26 mm. broad, the endopod 3 mm. long and 1,06 mm. broad, almost 3-times as long as broad; the slender stylamblys (Fig. 10*s*) which is 0,8 mm. long, 8-times as long as thick and furnished with cincinnuli (Fig. 10*t*) at the distal end, is implanted at a distance of 1,14 mm. from the base, i. e. about at one-third the length of the endopod.

The anterior border of the carapace on each side of the rostrum, the distal border of 1st antennular article and that of the carpus of the 1st thoracic legs show the same ochraceous colour as the eyes; the 1st joint of the antennular peduncle carries also somewhat of this pigment just below the eyes.

Anophthalmaxius de Man.

Anophthalmaxius J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Deel IX, Afl. 3 and 4. 1905, p. 593.

The genus *Anophthalmaxius* is chiefly characterized by the remarkable transformation of the eyepeduncles into two quadrangular plates, that have probably coalesced, not only with one another in the middle line, but also with the basal joints of the antennular peduncles; their upper surface is punctate and they are perhaps anteriorly emarginate. No trace of eyes at all [1]). Gastric region not falling steeply to rostrum, but continuous with it. Cervical groove distinct. Carapace excavate posteriorly, posterior margin concave. Abdominal pleura small, barely over-

1) Though in the single specimen, on which this genus was founded, the rostrum was rather badly damaged, the transformated eyepeduncles seemed to be uninjured and to present still their natural characters.

lapping one another. No distinct suture on exopod of last limb. Flagella of the internal antennae longer than the peduncle. Stylocerite small, scaphocerite spiniform, of good size. Maxillipeds of 2nd and 3rd pair with slender exopod, that of the 3rd pair consisting of a peduncle and an articulated flagellum.

Legs of 1st pair equal, chelate, those of 2nd also equal and chelate, much smaller. Legs of the 3 other pairs slender.

1. *Anophthalmaxius eccoptodactylus* de Man. Fig. 11—11*n*.

Anophthalmaxius eccoptodactylus J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. IX, Afl. 3 and 4, 1905, p. 594.

Stat. 271. Dec. 21. Arafura Sea. Lat. 5°46'.7 S., long. 134°0' E. 1788 m. Bottom: bluish green mud of a uniform appearance. 1 specimen.

Unfortunately the rostrum has badly been hurted, so that it proved to be impossible to describe exactly its length, shape and characters. The length of the carapace, measured in the middle line from its anterior to its posterior margin, is 4,9 mm., the abdomen measures 10,5 mm., the whole length therefore, without the rostrum, 15,4 mm. Carapace smooth, subcylindrical, little thicker at the branchial regions than anteriorly, because the latter are not inflated. The rostrum (Fig. 11), the tip of which is broken off and which is also hurted above, is apparently triangular, flattened and continuous with the gastric region, as both seem to be situated at the same level; the rostrum is 0,7 mm. broad at its base, i. e. just half the width of the carapace anteriorly and it is probably a little longer than broad. The sharp lateral margins are perhaps armed, quite anteriorly, with one or two very small teeth; they are continued backward, slightly diverging, as sharp ridges about to the middle of the gastric region. The rostrum carries in the middle line a sharp carina, that probably does not reach to the tip; the carina seems to bifurcate on the middle of the rostrum and to unite again at the base, but this character remained likewise uncertain. The median carina is continued backward to the middle of the gastric region, terminating here in a small oval prominence or tubercle, situated just behind the posterior extremity of the lateral carinae; behind this prominence the gastric region is not carinate. The rostrum carries at either side two rather long setae, one at the base, i. e. at the level of the anterior border of the carapace, near the lateral edge, the other beyond the middle, midway between the lateral margin and the median carina. The conspicuous cervical groove is situated, in the middle line, at a distance of 2 mm. from the posterior margin of the carapace and one and a half as far from the anterior border; the carapace is excavated posteriorly, the posterior border being concave. Anterior border of carapace unarmed.

The abdomen, twice as long as the carapace, without the rostrum, is rounded above, excepting the telson, and the terga curve continuously into the pleura, that are of moderate size. The 1st somite, 1 mm. long, is divided by a transverse groove, at one-fourth its length from the anterior margin, in two parts, the posterior of which is 3-times as long as the anterior; the anterior margin is slightly concave and the anterior part is 1,2 mm. broad. The posterior part is, anteriorly, broader than the anterior, its antero-lateral angles are rounded, and the lateral margins diverge a little backward, so that the 1st somite, posteriorly 1,7 mm. broad, appears nearly once and a half as broad as long. The pleura of the 1st somite, which,

like the following, are unarmed, narrow inferiorly to an obtuse point and their anterior border is slightly concave. The 2nd somite is little longer than the 1st, its lateral margins diverge somewhat, so that the 2nd somite appears also a little broader posteriorly than anteriorly; the lower margin of the 2nd pleura, that barely overlap those of the 1st and of the 3rd somites, is slightly curved and both their anterior and posterior extremities are obtuse: The lower border of the pleura of the three following somites is also a little arcuate and these pleura are also rounded anteriorly and posteriorly; they barely overlap the following. The 6th somite which is 1,6 mm. long and 1,8 mm. broad anteriorly, is slightly longer than the 2nd and little broader than long; the lateral margins converge slightly backward, so that the posterior margin is 1,3 mm. broad and the form of this somite trapezoidal; the upper side is somewhat arched from before backwards. The abdominal somites carry here and there some short setae.

The telson (Fig. 11*a*) is 2,2 mm. long without the median tooth on the posterior border and 2,32 mm., the tooth included; it shows, at $^1/_4$ its length from the anterior border, its greatest width of 1,48 mm., the telson appears thus one and a half as long as broad. The lateral edges, somewhat convex there where the telson shows its greatest width, are in the middle nearly parallel and curve finally into the rounded posterior margin; they are armed, the left (Fig. 11*b*) with three, the right with two sharp, immobile teeth of equal size; the foremost tooth is situated a little before the middle, the third just in the middle, the 2nd tooth is wanting on the right margin. There where the lateral edges curve into the posterior, they carry 4 or 5 movable spinules, that are smaller than the described teeth. The sharp median tooth of the posterior margin is continuous with the upper surface, 0,12 mm. long and half as broad at its base. At one-fourth its length from the anterior border the upper surface carries a transverse row of 10 or 12, rather short and stout, brown coloured bristles and a few setae are implanted symmetrically on the rest of the upper surface and near the posterior border. The latter is fringed with plumose, articulated setae, about 1 mm. long, on the lateral margins they are shorter. A microscopical denticle is visible on the middle of the telson at the left side, not far from the middle line and a fragment of another a little more forward on the right side: in unhurted specimens one or two pairs of small teeth may thus be present.

The caudal swimmerets (Fig. 11*a*) do not reach beyond the telson, when they are directed backward. Basal joint very small, unarmed. Exopod ovate, narrow at its base, broadly rounded apically; it is 1,85 mm. long, 1,2 mm. broad, one and a half as long as broad. The anterior border is slightly arcuate, finely serrulate on its distal half, fringed with short, ciliated setae and 2 or 3 movable spines occur at the distal end; from the latter a line runs inward, like the suture of an *Axiopsis*, but this line fades soon away, extending barely along a fifth part of the width of the exopod. There is a small, sharp tooth, 0,05 mm. long, at the inner end of this line and this tooth is placed near the apical border, only 0,11 mm. distant from it. A similar tooth, 0,06 mm. long, occurs, on the left exopod, a little farther backward, opposite the middle of the apical border and as near to it; on the right it is wanting. Between this tooth and the distal end of the anterior border a few rather short, plain and stout bristles are implanted, partly along the described, transverse line, and similar spiniform bristles are observed on the apical border, which is fringed with the same articulated, plumose setae as the telson. The two ribs are stout, the anterior a little longer and stouter than the

posterior that runs just in the middle of the plate. The endopod is just as long as the outer plate, 1,85 mm., but less broad, viz. 1,04 mm., so that it appears almost half as broad as long; the anterior border is straight and ends in a small tooth. The apical border is regularly rounded and, like that of the outer uropod, beset with plain, stout, spiniform bristles and much longer, plumose, articulated setae. A small tooth, 0,05—0,06 mm long, occurs on the distal extremity of the midrib near the apical border; on the left endopod a second, somewhat smaller tooth occurs on the rib a little more inward, on the right it is wanting. Between the rib and the anterior border a few fine setae are inserted on the upper surface.

Between the rostrum and the basal joints of the antennular peduncles two quadrangular plates (Fig. 11) are situated that have probably coalesced, not only with one another in the middle line, but perhaps also with the basal joints of the antennular peduncles, because when one of the latter was cut off, the basal joint proved to be open above. These plates are 0,6 mm. long from the anterior border of the carapace to their anterior margin and, their slightly arcuate outer border being somewhat directed inward, they appear a little less broad anteriorly than at their base. Their anterior border is broadly emarginate externally and reaches about to the distal third part of 1st antennular article, whereas their antero internal angle is rounded; the upper surface of these plates is closely punctate. When these plates are indeed unhurted, their shape and characters are very remarkable, for they ought to be considered as the homologa of the eyepeduncles: of eyes, however, no trace at all was discovered.

The internal antennae, measured on the lower side of the body until the extremity of the outer, olfactory flagella (the other flagellum is wanting on both antennulae) appear to be 5 mm. long, as long as the carapace without the rostrum, the peduncle being 1,48 mm. long, the olfactory flagellum 3,56 mm. The 1st joint of the peduncle, 0,8 mm. long, is 0.3 mm. broad at the distal extremity; it is a little enlarged, not much, until the terminal fourth part; both borders of the enlarged part are fringed with short setae and the outer terminates in a small, forwardly directed tooth, situated 0,2 mm. from the distal extremity. The auditory cavity is marked by a darkbrown spot on the middle of 1st article. The 2nd joint is cylindrical, 0,32 mm. long and 0,26 mm. thick; the 3rd, also cylindrical, is a little longer, viz. 0,36 mm. and 0,24 mm. thick, one and a half as long as thick. The filiform outer flagellum thickens very slightly until at one-fourth its length from the extremity and is here 0,13 mm. thick, at the proximal end, however, 0,1 mm.; it is composed of 22 joints, that are nearly all a little longer than thick, except the 1st that is very short; so e. g. the 4th joint is 0,19 mm. long and 0,115 mm. thick distally, the 18th joint, where the flagellum appears thickest, is 0,21 mm. long and 0,128 mm. thick, the terminal joint, finally, also 0,21 mm. long, but only 0,04 mm. thick at its base, slightly tapering and furnished with a few setae, 0,4 mm. long, at the distal end. The olfactory filaments are distinctly articulated.

The antennal peduncle (Fig. 11) outreaches by its terminal joint that of the inner antennae and appears a little more slender than the latter, looked at from above. The acute stylocerite is very short and small, reaching, in a dorsal view of the body, not yet as far forward as the small tooth on the outer margin of 1st antennular article. The spiniform scaphocerite is of good size, reaching, in a dorsal view, to the middle of the 4th joint and to

the middle of 2nd antennular article; the scaphocérite of the right antenna carries a small sharp tooth on its outer edge just behind the pointed tip, but this tooth, wanting on the left, is very likely abnormal. There is also a small sharp tooth at the distal end of the lower border of 3rd article; the penultimate joint, 3-times as long as thick, is 0,7 mm. long; flagella lost.

The exopod of the 2nd maxillipeds (Fig. 11*c*, exopod not figured) is about as long as the endopod.

The external maxillipeds (Fig. 11*d*) are pediform and long, reaching as far forward as the antennal peduncle. The ischium is 1 mm. long and 0,3 mm. broad in the middle, more than 3-times as long as broad; the merus is almost as long as the ischium, but 0,35 mm. broad in the middle and its slightly curved, lower margin carries a small, sharp tooth not far from the distal end. The two following joints are subequal, a little shorter than the merus and the slightly curved dactylus is still shorter, 0,56 mm. long and shows its greatest thickness of 0,2 mm. not far from the articulation, being 3-times as long as thick. The crest on the inner side of the ischium is armed with 16 or 17 sharp teeth, that increase somewhat in length distally; a few very small teeth occur near the base of this joint between the crest and the inner margin. The joints are fringed, as usual, with long setae on their inner margin. The exopod is filiform, 2,45 mm. long and reaches beyond the merus-joint of the endopod; the peduncle is 0,7 mm. long and 7-times as long as broad, the indistinctly articulated flagellum is tipped at its extremity with long ciliated setae. There is also a narrow epipod with filaments and a gill.

The legs of the 1st pair (Fig. 11*e*) are equal. The coxae carry a very small, sharp tooth on the distal border of their posterior surface near the inner margin. The sharp lower margin of the ischium carries 3 or 4 sharp teeth, the foremost of which, not far from the distal extremity, is twice as large as the rest. The merus, strongly compressed like the ischium, is 2,6 mm. long and presents its greatest width of 0,8 mm. at one-third its length from the carpal articulation, being here one and a half as broad as at the proximal extremity; the nearly straight, upper border of the merus, that appears a little more than 3-times as long as broad, carries a small tooth not far from the distal extremity, whereas the slightly arcuate lower is armed with 5 small sharp teeth of equal size, of which the 1st is as far distant from the proximal extremity as the 5th from the distal; between these teeth some long hairs are observed, that are 1 mm. long. The triangular carpus is 0,85 mm. long and 0,78 mm. broad distally. The characteristic chelae are 3 mm. long until the apex of the immobile finger and a little longer than the merus; the palm, 1,7 mm. long and 1,25 mm. broad, widens a little from the carpal articulation to that of the fingers and is almost one and a half as long as broad. Near the almost straight, upper margin that carries a microscopical denticle not far from the distal end, a few short setae are inserted on the outer side and some occur also near the distal border that articulates with the dactylus. The nearly straight, lower margin of the chela is fringed with rather long, plain hairs until near the tip of the immobile finger and a few short setae are implanted just near it on the outer side. The immobile finger is triangular (Fig. 11*f*), its acuminate extremity is not at all turned upward; the oblique, straight and sharp cutting-edge is armed with four teeth, of which the first near the base of the finger is quite characteristic. This tooth is large, subacute, its distal border slightly convex, whereas the proximal runs distinctly concave until the articulation;

this tooth fits in a semicircular notch of the dactylus, opposite to it, from which character the name of this species is derivated. The 2nd tooth, situated on the middle of the prehensile edge, is considerably smaller, its height being one-fourth that of the 1st; this tooth is triangular, acute, its margins are straight, the distal margin shorter than the proximal. The 3rd tooth that is as far distant from the 2nd as the 2nd from the 1st, is again much smaller than the 2nd and directed forward, the microscopical 4th tooth is placed a little nearer to the tip of the finger than to the 3rd. Between the teeth the prehensile edge is entire and sharp; the outer side of this finger carries some tufts of setae. The dactylus, 1,9 mm. long, measured along its upper border, appears a little longer than the immobile finger; it is somewhat curved and terminates, tapering, also in a slender pointed extremity; the concave notch near the base for the large tooth of the immobile finger is not deep, its depth being one-fourth the breadth of the finger; the slightly concave cutting-edge between the notch and the tip carries about a dozen microscopical, sharp teeth of equal size. Tufts of long setae are implanted near the arcuate upper border both on the outer and on the inner side of the finger and these setae carry short ciliae on their distal half; other tufts of hairs occur on the outer side of the finger.

The 2nd legs (Fig. 11*g*) are much smaller than the anterior. The merus, 2,2 mm. long, shows its greatest width of 0,48 mm. at one-third its length from the distal end, being almost 5-times as long as broad; the lower border, which, except near both extremities, is fringed with long setae, 1,4 mm. long, carries there where it shows the greatest breadth, a very small, sharp tooth, 0,03 mm. long; the upper border is straight, the lower slightly arcuate. The carpus is short, 0,92 mm. long, and just half as broad somewhat beyond the middle; the curved lower border is fringed with 5 or 6 long setae, 1,4 mm. long, a few shorter setae occur on the upper. The chela is 1,45 mm. long, one and a half as long as the carpus and 0,64 mm. broad, somewhat more than twice as long as broad; the palm, 0,54 mm. long, appears nearly half as long as the fingers that shut close together; the straight cutting-edge of the triangular fixed finger carries, along its whole length, 24 or 25 small, sharp teeth (Fig. 11*h*), similar teeth stand also on the tapering dactylus, but are here smaller, inconspicuous and near the articulation they are wanting at all. The upper and lower margins of this chela are fringed with long setae that decrease in length towards the apices of the fingers; short transverse rows of setae occur also on the lower half of the outer side of the palm and on that of the fixed finger.

The other legs are slender, compressed and unarmed. The slender merus of the 3rd legs, 2,8 mm. long, is 7-times as long as broad; the carpus is half as long, viz. 1,3 mm. and 4-times as long as thick. The propodus, (Fig. 11*i*), is 1,5 mm. long and 5-times as long as broad, presenting its greatest width of 0,3 mm. not far from the carpal articulation and narrowing somewhat distally; both margins, especially the lower, carry tufts of setae and 2 or 3 setae occur at the distal end of the upper border of merus and carpus and of the lower border of the latter, some also on the outer surface. The slender, almost straight dactylus is 0,74 mm. long; it is 0,13 mm. broad at its base, tapers to the straight, pointed tip and is also fringed with some setae.

The merus of the 4th legs is 2,3 mm. long and somewhat more than 6-times as long as broad; excepting a few setae at the far end of the upper border it appears nearly glabrous, like that of the 3rd legs. The slender carpus is 1,4 mm. long and somewhat more than 4-times

as long as broad. The propodus (Fig. 11*f*) is 1,6 mm. long and, like that of the 3rd legs, 5-times as long as broad; two ciliated setae occur at the distal end of the upper border, that are almost as long as the dactylus; a tuft of pectinated bristles and ciliated setae are implanted along the distal third of the lower margin and 2 or 3 longer hairs occur in the middle. The slender dactylus, 0,7 mm. long and 0,1 mm. broad at its base, resembles that of the 3rd pair, but two strong, movable, spiniform bristles are implanted on the proximal half of the upper [1]) border, of which the anterior, 0,17 mm. long, is a little longer than the other.

The merus of the 5th legs is 2 mm. long and nearly 6-times as long as broad; the carpus is half as long and 4-times as long as broad. The propodus (Fig. 11*k*) is 1,8 mm. long, longer than that of the two preceding legs and widens a little until just beyond the middle, being here 0,26 mm. broad and 0,21 mm. at the proximal end. The distal third part of the outer surface of this joint which is 7-times as long as broad, is thickly covered with a tuft of ciliated bristles and setae and the lower margin runs here slightly concave; a few short pectinated bristles occur on the truncate, distal border of this joint, close by a very short, stout spine, 0,06 mm. long, at the obtuse, distal end of the lower border. The slender dactylus is 0,8 mm. long, 0,12 mm. broad at its base, tapers to the slender tip and is also furnished with setae; its lower edge is, along the proximal fourth part, emarginate (Fig. 11*l*) and appears here on the outer side crenulate, the crenulations being 8 or 10 in number and obtuse. The terminal part, long 0,13 mm., of the dactylus is apparently separated from the rest by a transverse suture; this suture exists also on the dactyli of the two preceding legs. There is a small spine near the base of each leg of the 5th pair.

The lateral margins of the sternal plaque end anteriorly in a sharp point, it is bilobed, as usual, posteriorly.

First abdominal somite without appendages. Those of the 4 following are biramous, the rami foliaceous, rather narrow, elliptical and provided with a stylamblys; the peduncle is short, as long as broad. So e. g. the protopod of the 2nd pleopods (Fig. 11*m*) is 0,7 mm. long and broad, its rounded, inner border carries a few plumose setae. The elliptic exopod is 1,72 mm. long and 0,46 mm. broad, 4-times as long as broad, and both extremities are obtuse; the endopod is 1,94 mm. long, a little longer than the outer ramus and presents its greatest width of 0,54 mm. midway between the base and the insertion of the stylamblys, the proportion between length and breadth being as in the exopod. The cylindrical stylamblys (Fig 11*n*), 0,44 mm. long and 0,06 mm. thick in the middle, being 7-times as long as broad, tapers somewhat to the obtuse tip, that carries a few cincinnuli and is implanted at a distance of 0,7 mm. from the base, i. e. about at one-third the length of the plate. The endopod narrows a little more distally than the other plate.

Axiopsis Borr.

The genus *Axiopsis* Borr., distinguished from the preceding genera by the exopod of the caudal swimmerets being divided by a transverse suture, differs from the two other genera with the same character, *Oxyrhynchaxius* Parisi and *Calocaris* Bell, by the hinder part of the

1) In my description of 1905 I wrote "on the lower margin", but according to the figure 11*j*, drawn by me June 1922, it should be 'on the upper margin".

carapace that is rounded, not carinate (excepting *Ax. Habereri* (Balss), *Ax. spinosissima* (Rathbun) and *Ax. biserrata* (von Martens)). This genus includes two subgenera *Calocarides* Wollebaek and *Paraxiopsis* de Man, of which the former apparently only differs from the typical genus *Axiopsis* s. s. by the non-pigmented, pale eyes, the latter by the very small antennal thorns. The genus *Axiopsis* contains at present 23 species, of which 16 with one variety belong to the subgenus *Axiopsis* s. s., 2 to *Calocarides* and 5 to *Paraxiopsis*. While until 1921 the subgenus *Axiopsis* s. s. was not known to occur on the coasts of Europe, Dr. E. Caroli has described in that year a species, new to science, from the Gulf of Naples under the name of *Axiopsis mediterranea*: of this species a single male was captured December 17, 1915, off the coast of Posillipo at the depth of a few meters. Neither off the east coast of North or South America nor on the west coast of Africa or in the Atlantic Ocean the subgenus *Axiopsis* has been observed, but *Ax. inaequalis* (Rathb.) is known from Porto Rico and *Ax. longipes* Bouv. from Barbados. *Axiopsis spinulicauda* (Rathb.) occurs off Bodega Head, California. The 12 other species are all inhabitants of the Indopacific seas. *Ax. princeps* (Boas), a species of large size (75 mm.), is still only known from Wladiwostock and *Ax. Habereri* (Balss) was taken at Fukuura, Sagami Bay, Japan. The Hawaiian Islands are the habitat of *Ax. pailoloensis* (Rathb.), *rudis* (Rathb.), *serratifrons* (A. M.-Edw.) and *spinosissima* (Rathb.), species of which the first and the last occur also in the Indian Archipelago between the islands of Wowoni and Buton, while *Ax. serratifrons* is distributed from the Hawaiian and Marshall Islands through the Indian Ocean to the Red Sea. This species, indeed, has, besides from the Hawaiian Islands, also been recorded from the Fanning, Samoa and Palau Islands, from many localities in the Indian Archipelago, from the Maldives, the Chagos Archipelago, Obock and the Red Sea. The remarkable *Ax. clypeata* (de Man), concerning which Mr. Borradaile wrote in 1903 that it should probably become the type of a new genus (in: Annals and Magazine of Natural History, Ser. 7, Vol. XII, November 1903, p. 539), is still only known from Amboina. *Ax. consobrina* de Man is distributed throughout the Indian Archipelago and was taken in the Sulu Sea, between the islands of Wowoni and Buton and in Solor-strait, *Ax. australiensis* de Man is still only known from Port Jackson. *Ax. Picteti* (Zehntner), easily recognizable by the telson, which is broader than long, is still only known from the islands of Amboina and Kabaëna; a remarkable variety *spinimana* de Man occurs at the latter locality. *Ax. tenuicornis* de Man was taken off the eastern extremity of Java, *Ax. pitatucensis* de Man, finally, at the island of Buka, near German New Guinea.

Of the two species of *Calocarides*, *Ax. (Calocarides) coronata* (Trybom) occurs in the Skager Rack and in the Kosterfjord, the other, *Ax. (Calocarides) crassipes* (Trybom), also in the Kosterfjord, but this species was taken moreover in the Hjoerund Fiörd near Aalesund and in Byfiord near Bergen.

Of the five species of the subgenus *Paraxiopsis*, *Ax. defensa* (Rathb.) was taken off Porto Rico, West Indies, the four others are inhabitants of the Indopacific seas. *Ax. aethiopica* Nobili occurs in the Red Sea and at Djibouti; *Ax. biserrata* (von Martens) is known from Malakka and Singapore, *Ax. bisquamosa* de Man was taken by the "Siboga" off Lirung, Salibabu-island and occurs also at Ralum on the Gazelle Peninsula, New Pommerania, *Ax. Brockii* (de Man), finally, the type species of this subgenus, is known from the Bay of Batavia, Madura-

bay and other localities in the southern part of Molo-strait, from the Borneo-bank, the Karakelang-islands, Amboina, from the vicinity of Waigeu Island and from the island of Buka, German New Guinea, this species being distributed throughout the whole Archipelago.

Ax. serratifrons (A. M.-Edw.) inhabits the reef, like *Ax. Picteti* and its variety; the other species, the two from the West Indies like those from the Indopacific seas, are found at moderate depths, the greatest depth, 180 fathoms, being that at which *Ax. tenuicornis* de Man was taken. *Ax. mediterranea* Caroli was found in shallow water. The two species of *Calocarides* were taken at moderate depths, varying between 120 and 273 fathoms. Of *Ax. (Paraxiopsis) aethiopica* Nobili and *Ax. (Paraxiopsis) biserrata* (von Martens) the mode of life is quite unknown. *Ax. (Paraxiopsis) Brockii* (de Man) inhabits the reef or was taken in shallow water from 32 to 50 fathoms, *Ax. (Paraxiopsis) bisquamosa* was captured in 20, the Porto Rican species, finally, *Ax. (Paraxiopsis) defensa* (Rathb.) in $8^1/_2$ fathoms.

Key to the known species of the genus *Axiopsis* Borr.

Subgenus **Axiopsis** s. s.

a_1 No keel on the hinder part of the carapace, extending from the cervical suture to the posterior margin [1]).

b_1 No row of spines along the posterior border of the cervical suture.

c_1 Telson longer than broad.

d_1 Gastric region armed with teeth or spines.

e_1 Distal part of outer uropod, delimited by the suture, transverse, shorter than broad at its base. No shield-like tubercle on the middle of the gastric region.

f_1 Gastric region with five dorsal carinae, all armed with teeth or spines: one median, two submedian and two outer or lateral carinae.

g_1 All the gastric carinae armed with 9 or more than 9 teeth or spines.

h_1 Numerous teeth between the median and the submedian carinae. In adult specimens the median carina carries about 25 teeth, the submedian carinae 17, the lateral 20 or 21 and one observes 45 or 46 similar teeth between the median carina and either submedian one — *serratifrons* (A. M.-Edw.).

h_2 No numerous teeth between the median and the submedian carinae.

i_1 At either side of the median carina one single submedian row of teeth. Lateral margins of telson parallel, with 4 teeth, of which the anterior is situated in front of the middle.

1) In *Ax. spinosissima* (Rathb.) the hinder part is also distinctly carinate for about its posterior two third parts, this species, however, differs from all the others by the spines along the posterior border of the cervical groove.

Upper border of merus of anterior legs armed with a spine . . . . . *consobrina* de Man.

i_2 At either side of the median carina two submedian rows of teeth or prominences that unite anteriorly.

Lateral margins of telson converging backward, with 3 teeth, of which the anterior is situated in the middle of the margin. Upper border of merus of anterior legs unarmed . . . . . *australiensis* de Man.

(J. G. DE MAN, in: Mitteilungen des Zoologischen Museums zu Berlin, Bd. 12, Heft 1, 1925, p. 127, fig. 4—4*j*).

g_2 Each of the five gastric carinae armed with 4 equidistant spines including the tooth at the base of the rostrum.

Penultimate joint of antennal peduncle very long and slender, 9-times as long as thick, scaphocerite as long as this joint . . . . . *tenuicornis* de Man.

g_3 Lateral carinae armed with 3 or 2 teeth, including the tooth at the base of the rostrum.

j_1 Lateral margins of rostrum armed in front of the basal tooth with 2 or 3 teeth.

k_1 Median carina with one small spine; a short, faint submedian carina armed anteriorly with two spinules *inaequalis* (Rathb.).

(M. J. RATHBUN, The Brachyura and Macrura of Porto Rico, Wash. 1901, p. 96, fig. 18*a* and *b*).

k_2 Median carina two-toothed near its middle; submedian carina irregularly serrate . . . . . *pailoloensis* (Rathb.).

j_2 Lateral margins of rostrum armed, in front of the basal tooth, with one tooth, just beyond the middle.

Lateral carinae with 3 teeth, including the basal tooth of the rostrum. Telson barely longer than broad. . *pitatucensis* de Man.

(J. G. DE MAN, in: Mitteilungen des Zoologischen Museums zu Berlin, Bd. 12, Heft 1, 1925, p. 133, fig. 5—5*f*).

f_2 Of the five dorsal carinae on the gastric region the outer or lateral, a continuation of the outer or lateral margins of the rostrum, are unarmed.

l_1 Median carina dentate.

m_1 Submedian carinae dentate.

Fingers of larger chela of the male as long, those of smaller chela almost twice as long as the palm *princeps* (Boas).

(J. E. V. BOAS, Studier over Decapodernes Slaegtskabsforhold, København, 1880, p. 98, Tab. VII, fig. 214—217).

m_2 Submedian carinae unarmed . . . . . *spinulicauda* (Rathb.).

(M. J. RATHBUN, Decapod Crustaceans of the Northwest coast of North America, New York 1904, p. 149, fig. 90*a*, 90*b*).

l_2 Median carina unarmed.

Either submedian carina three-spined. Palm of larger cheliped of female nearly one and a half times as long as high, fingers two-thirds as long as palm . *rudis* (Rathb.).

(M. J. RATHBUN, The Brachyura and Macrura of the Hawaiian Islands, Wash. 1906, p. 894, fig. 51*a—c*).

e_2 Distal part of outer uropod, delimited by the suture, small, triangular, movable, with the lateral margins hairy, finely spinose and terminating in a spine. Median carina with a shield-like protuberance on the middle of the gastric region.

In front of this protuberance the median carina bears a tooth at a short distance from the base of the rostrum; three teeth on either side of the median carina, not arranged in a longitudinal line . . . . . *clypeata* (de Man).

(J. G. DE MAN, in: Archiv f. Naturgeschichte, 53. Jahrg. Berlin, 1888, p. 470, Taf. XX, fig. 2).

d_2 Gastric region unarmed.

Rostrum triangular, $1\,^1/_2$-times as long as broad at base, with 5 obtuse teeth at either side. Fourth antennal article $1\,^1/_2$-times as long as fifth . . . . . *mediterranea* Caroli.

(E. CAROLI, Talassinidei nuovi o rari del Golfo di Napoli, Napoli 1921, p. 254, fig. 1, Tav. 9 e 10, in: Pubblicazioni della Stazione Zoologica di Napoli, Vol. III, 1921).

c_2 Telson broader than long.

n_1 Upper border of chelae of anterior legs smooth, entire . . . . . *Picteti* (Zehntner).

n_2 Upper border of chelae of anterior legs armed with strong spines . . . . . *Picteti* (Zehntner) var. *spinimana* de Man.

b_2 A row of spines along the posterior border of the cervical suture.

All the five gastric carinae armed with numerous spines . . . *spinosissima* (Rathb.).

a_2 A sharp median carina extends from the cervical suture to the posterior border of the carapace.

Of the five gastric carinae the median one ends anteriorly in a spine, submedian carinae armed with 7 teeth, outer or lateral unarmed. . . . . *Habereri* (Balss).

(H. BALSS, Ostasiatische Decapoden II, München 1914, p. 85, fig. 46, 47, in: Abhandl. der math.-phys. Klasse der K. Bayer. Akademie der Wissenschaften. II. Suppl.-Bd. 10. Abhandl.).

Axiopsis longipes Bouv. from Barbados could not be inserted into the key, because the original description, without figures, is too brief and insufficient (E. L. BOUVIER, in: Compt. Rend. Acad. Sciences de Paris. T. 141. Paris 1905, p. 802—806). This species is closely allied to *Ax. inaequalis* (Rathb.) from Porto Rico, but the eyestalks are short, with a very large cornea, the chelae of 1st pair very long and on the gastric region are two longitudinal rows, either of three strong spines.

Subgenus **Calocarides** Wollebaek.

a_1 Chela on the right first peraeopod about the length of the carapace, (measured in the middle line, rostrum not included). Dactylus very much curved . . . . . *crassipes* (Trybom).

(F. Trijbom, Two new Species of the genus Euconaxius. With 2 plates. Stockholm 1904, p. 390, Pl. 20, fig. 11 and 12, in: Arkiv för Zoologi utgifvet af K. Svenska Vetenskapsakademien, Band I).

a_2 Chela on the right first peraeopod a little more than half the length of the carapace (rostrum included). Dactylus only slightly curved. Chela generally speaking considerably weaker than in the preceding . . . . . *coronatus* (Trybom).

(F. Trybom, l. c. p. 384, Pl. 20, fig. 1—10, 13, 14, Pl. 21).

(Confer for these two species: A. Wollebaek, Remarks on Decapod Crustaceans of the North Atlantic and the Norwegian Fiords. I. *Calocarides*, n. subgenus of Fam. *Axiidae*, in: Bergens Museums Aarbog 1908, no. 12).

Subgenus **Paraxiopsis** de Man.

a_1 Of the five dorsal carinae on the gastric area the submedian ones are well developed, ending anteriorly in a tooth or armed with spines.

b_1 Submedian carinae ending anteriorly in an obtuse tooth; when they are interrupted, the posterior part ends also in a tooth. Posterior to a large tooth at base of rostrum one or two similar teeth are observed on the continuation of its lateral borders. Median carina with a tubercle on the middle of the gastric region *Brockii* (de Man).

b_2 Submedian carinae armed with spines.

c_1 Median carina with a tubercle or spine at its middle.

d_1 Posterior to the strong tooth at base of rostrum, in front of which tooth the lateral margins bear a few minute denticles, only one tooth occurs on the lateral carinae of the gastric area. Posterior fourth of the hinder part of the carapace carinate . *biserrata* (von Martens).

(E. von Martens, Monatsber. Kön. Preuss. Akad. Wissensch. zu Berlin, 1868, p. 612; G. Nobili, in: Bollett. dei Musei di Zool. ed Anat. Comp. della R. Università di Torino. N. 455. Vol. XVIII, 1903, p. 12; J. G. de Man, in: Mitteilungen des Zoologischen Museums zu Berlin, Bd. 12, Heft 1, 1925, p. 138, fig. 6—6*b*).

d_2 Posterior to the strong tooth at base of rostrum, in front of which tooth the lateral margins are entire, the lateral carinae of the gastric area are armed with two spines, the anterior the larger . . . . . *defensa* (Rathb.).

(M. J. Rathbun, The Brachyura and Macrura of Porto Rico, Wash. 1901, p. 95, figs. 17*a* and 17*b*).

c_2 Median carina armed with 5 to 7 spines.
Lateral carinae of the gastric area with 5 or 6 spines; between the lateral carinae and the median one occur, not one, but two submedian carinae, armed each with 4 or 5 spinules or one observes here smaller and more numerous spinules. . . *aethiopica* Nobili.
(G. Nobili, Annales Sciences Nat., Zoologie, 9e Série, T. IV, 1906, p. 93, Pl. VI, fig. 1).

a_2 Instead of submedian carinae one observes a little behind the two large teeth at the base of the rostrum, between which the gastric area is carinate in the middle line, at either side of this carina a low squamiform tubercle, that is rounded anteriorly.
Median and lateral carinae unarmed . . . . . *bisquamosa* de Man.

1. *Axiopsis (Axiopsis) serratifrons* (A. M.-Edw.). Pl. VI, Fig. 12—12*i*.

Axia serratifrons A. Milne-Edwards, Journal Mus. Godeffroy 1873, Heft IV, p. 11, Pl. II, fig. 6.
Axius spinipes J. G. de Man, Archiv f. Naturgeschichte, 53. Jahrg. 1888, p. 464, Taf. XIX, fig. 6.
Axius affinis J. G. de Man, ibidem, 1888, p. 469, Taf. XX, fig. 1.
Axius spinipes L. Zehntner, Crustacés de l'Archipel Malais, Genève 1894, p. 195.
Axiopsis affinis L. A. Borradaile, Fauna and Geography Maldive and Laccadive Archipelagoes, Vol. II, Part 3, 1904, p. 752.
Axius serratifrons M. J. Rathbun, The Brachyura and Macrura of the Hawaiian Islands, Wash. 1906, p. 895.
Axiopsis spinipes G. Nobili, Faune Carcinologique de la Mer Rouge, Décapodes et Stomatopodes, Paris 1906, p. 91.
Axiopsis affinis G. Nobili, ibidem, p. 92.
Axiopsis spinipes L. A. Borradaile, in: Transact. Linnean Soc. London, 2nd. Ser. Zoology, Vol. XIII, Part 2, London 1910, p. 262.
Axius serratifrons Ch. H. Edmondson, Crustacea from Palmyra and Fanning Islands, Honolulu, Hawaii 1923, p. 27.
Axiopsis serratifrons A. Sendler, Die Decapoden und Stomatopoden der Hanseatischen Südsee-Expedition, Frankfurt a/M. 1923, p. 44, Taf. 6, fig. 10.

Stat. 142. August 5/7. Anchorage off Laiwui, Coast of Obi Major. Reef. 1 young male.
Stat. 144. August 7/9. Anchorage north of Salomakiee — (Damar) Island. Reef. 1 young male.
Stat. 181. Sept. 5/11. Ambon. Reef. 1 young male.
Stat. 213. Sept. 26—Oct. 26. Saleyer-Anchorage and Surroundings. Reef. 2 young males.
Stat. 225. Nov. 8. South-Lucipara-island. Reef. 1 young male.
Stat. 248. Dec. 4/5. Anchorage off Rumah Lusi, Northpoint of Tiur-island. Reef. 1 young specimen.
Stat. 250. Dec. 6/7. Kur-island. Reef. 1 adult male.
Stat. 301. Jan. 30—Febr. 1., 1900. Lat. 10° 38′ S., long. 123° 25′.2 E. Pepela-bay, east coast of Rotti-island. Reef. 1 egg-laden female.

In my description of *Ax. spinipes* (l. c. 1888, p. 467, footnote) I have already noticed that the figures of *Axia serratifrons* in A. Milne-Edwards' paper are no doubt incorrect, because in Fig. 6 the fingers of the 2nd pair of legs appear as long as, but in Fig. 6*a* considerably shorter than the palm. The examination of a cotype from the Museum at Hamburg proved forthwith the correctness of my supposition and did me conclude that *Ax. spinipes* (de Man) and *Ax. affinis* (de Man) ought to be considered as varieties, probably individual, of *Ax. serratifrons* (A. M.-Edw.).

The cotype from the Museum Godeffroy, kindly sent me by Prof. Pfeffer, for which

I beg him to acknowledge my best thanks, has the number 1723, a number not mentioned in A. MILNE-EDWARDS' paper: it was collected at Upolu. It is a female without eggs, 28 mm. long from tip of rostrum to end of telson, the carapace measuring 11,25 mm., the abdomen 16,75 mm. The denticulated area and the rostrum closely agree with fig. 6, the rostrum reaching to the middle of the 2nd joint of the antennular peduncle; the lateral margins of the rostrum are armed each with 5 teeth, their prolongations on to the gastric region with 16, that gradually become lower from before backward. The median ridge is rather indistinct in fig. 6 and its anterior part in front of the denticulated area of the gastric region carries in that figure no teeth at all: the median ridge carries, however, indeed 21 or 22 teeth, 7 or 8 of which stand on the anterior rostral part. Between the median and the submedian ridges one observes on either side 31 or 32 small teeth, that are arranged irregularly. Posterior to the cervical groove the carapace is distinctly pitted, the puncta are rather large, though situated not densely, above and on the upper part of the branchial regions; on the lower part of the latter they are smaller but situated very densely near one another.

The abdominal somites are also coarsely, though sparsely, pitted. The posterior margin of the 2nd—5th pleura is regularly arcuate and the 3rd—5th carry a very small, sharp tooth at the angle which makes their anterior border with the lower; the pleura of the 1st somite carry also a small tooth at their lower angle, like also those of the 6th. The pleura are distinctly concave on their surface anteriorly, especially those of the 2nd somite.

The antennular peduncle reaches to the middle of the penultimate joint of that of the outer antennae. The acute spine in which terminates the outer border of the 2nd joint of the antennal peduncle, the stylocerite, reaches as far forward as the proximal 3rd part of the penultimate joint and the inner border ends also in a small, sharp tooth; the movable, spiniform scaphocerite that is wanting in the figures of the "Journal des Museum Godeffroy", extends to the distal 4th part of the penultimate joint and carries a small, sharp tooth at the inner side of its base.

The left leg of 1st pair is the larger. The lower border of the ischium carries four small sharp spines that regularly increase in length distally. The lower border of the merus, which is 5,4 mm. long and 2,4 mm. broad, is armed on its inner side with four spines, two near the base and two just beyond the middle; the small tooth on the upper border is rudimentary. The chela is 9 mm. long, the palm 5,75 mm. long and 3,6 mm. broad, the fingers 3,25 mm. long; it agrees closely with figure 6*a*. The outer side of the palm is covered with squamiform granules, like also the inner; the fingers are smooth, the dactylus carries a low tooth near the base, a low tooth stands also on the immobile finger midway between the tip and the articulation. The right leg agrees also with the figures. Ischium and merus are armed each on their lower border with four spines; the merus is 5 mm. long, 2 mm. broad and the small tooth on the upper border is also rudimentary. The chela is 7,4 mm. long, the palm 4,25 mm. long and 1,75 mm. broad, nearly $2^1/_2$-times as long as broad; both the upper and the lower border of the hand are distinctly ridged, like on the larger chela, but both ridges are smooth. The outer side is smooth in the middle, with only a few coarse punctations, each carrying a granule, near the upper and near the lower border.

The lower margin of the merus of the 2nd legs is armed with a spine at the distal

end of the outer surface and with another just beyond the middle, the latter is preceded on the right leg by two smaller spinules.

The merus of the 3rd legs has a small spine at the distal end of its outer surface. The inner border of the coxae of the 1st—3rd legs terminates at the distal end in a small sharp tooth and the coxae of the 3rd and 4th legs present another acute tooth at the base of their inner margin, that on the 4th is larger than on the 3rd.

The sternal plaque ends, at either side, anteriorly in a sharp tooth, that is directed straight forward; it is deeply concave anteriorly, grooved in the middle line of its posterior half and the lateral margins of the plaque are anteriorly curvate. The scales on the outer side of the legs of the 5th pair carry a small tooth at the anterior end of their inner border.

It appears from the preceding description that the principal differences, described as existing between *Ax. serratifrons* and the two other species (*spinipes* and *affinis*), do indeed not exist. The scaphocerite and the stylocerite of the antennal peduncle are shorter than in the types of *Ax. spinipes* and *affinis*, but the specimens collected by the "Siboga" prove that their length is variable. According to A. Milne-Edwards (in: Bulletin Soc. Philomath. de Paris, 1879, p. 10) in *Axius acanthus* the inequality of the legs of the 1st pair should be rather variable: this may, therefore, be also the case in the present species.

After these remarks on the type of *Ax. serratifrons*, we now pass to the specimens collected by the Siboga Expedition.

The adult male from the reef at Kur-island, that has no doubt come to its full size, is not only considerably larger than all the other specimens collected by this Expedition, but also than all those which previously have been referred to *Ax. serratifrons*, to *Ax. spinipes* and to *Ax. affinis*.

This specimen, indeed, is 73 mm. long, the carapace, measured in the middle line, 24 mm., the abdomen 39 mm. The rostrum (Fig. 12) that reaches to the middle of the 2nd joint of the antennular peduncle, and the denticulated area of the gastric region fully agree with the described cotype from Upolu. The tip of the rostrum is curved upward as a tooth and the lateral borders carry on the left side 5, on the right 6 teeth; the continuations of the lateral borders on to the gastric region carry 20 or 21 teeth, that are subacute and gradually decrease in size backward. The median ridge carries about 25 teeth, either submedian 17 and between the median and either submedian ridge are situated 45 or 46 similar teeth. The greatest width between the lateral ridges, just midway between apex of rostrum and the posterior end of the denticulated area, is 5,75 mm. long, whereas the two submedian ridges are 3,75 mm. distant; some short hairs, partly arranged in small tufts of 3 or 4, are inserted between the teeth. The anterior border of the carapace carries, just above the antennal peduncle, a small sharp tooth, that in younger specimens is not yet developed. The lateral walls of the gastric region are coarsely pitted on their posterior half, a few coarse punctations exist also more anteriorly; rather large and deep pits occur on the cardiac region between the cervical groove and the posterior extremity of the carapace and in these pits, that are separated by quite smooth interstices and that are largest on the upper parts, small tufts of short setae are inserted. Like as in the type, the branchial regions are covered with rather deep pits and impressed

puncta of unequal size; these pits and punctations are, however, here much more numerous than on the rest of the carapace, so that they are situated more densely. A small anterior part of the lateral walls of the carapace, situated just behind the anterior margin between the cervical groove and the lower border of the carapace, is quite smooth, not punctate.

Terga and pleura of the abdomen coarsely punctate as in the Upolu type, but in all the pits and puncta tufts of setae are inserted, so that the abdomen appears very hairy, like the hinder part of the carapace, posterior to the cervical groove. The pleura are slightly concave, those of the 3rd—5th somites are smooth, just behind their anterior margin, but the greater posterior half is coarsely and densely pitted. In the 3rd—5th pleura there is a very small, sharp tooth at the junction of the slightly concave, anterior border and the lower margin; on the 5th this tooth is a little larger than on the two preceding pleura, the small tooth at the lower angle of the 6th pleura is also distinct. In the Upolu cotype the posterior margin of the pleura is regularly arcuate: in the full-grown male from Kur-island this is not the case. The posterior margin of the pleura of the 2nd somite is nearly regularly arcuate and the angle that it makes with the lower, is almost rounded, obtuse. In those of the 3rd somite the posterior border is straight on its lower half and the angle with the lower margin is distinct, though obtuse; the posterior border of the 4th and 5th appears even slightly concave on its lower half and the angle with the lower border is still more conspicuous. The telson of this male from Kur-island is 8,5 mm. long, the median spine of the posterior margin included, and 7,5 mm. broad. The anterior border of the inner uropod is armed with 2 spines, one at the distal end and one immediately behind it; the rib on the middle of this swimmeret carries 5 spines, standing along the whole length. The anterior border of the outer uropod is armed with 5 spines on its distal half, besides a movable spine, twice as long, at the distal end; a small spine occurs at the base, just near the basal joint, and 4 spines, slightly larger than those of the anterior margin, occur on the anterior of the two longitudinal ribs. Along the transverse suture of the left, outer uropod one observes 14 small spines, in two sets each of 7, the anterior between the anterior border and the posterior rib, the posterior extending from the latter backward; on the suture of the right swimmeret are 15 spinules inserted along the whole length.

The eyepeduncles that are thickened at their base and of which the cornea is deep black, reach almost to the distal end of 1st antennular article. The inner antennae are 21,5 mm. long, almost as long as the carapace, the peduncle measuring 5 mm., the inner flagellum which is the longer, 16,5 mm. The 1st joint of the peduncle appears slightly longer, looked at inferiorly, than the two following together, that are of equal size; the peduncle extends to the middle of the penultimate joint of that of the outer antennae.

The external antennae are 36,5 mm. long, one and a half as long as the carapace, the peduncle measuring 10 mm. The sharp spine into which terminates the outer border of the 2nd joint, the stylocerite, reaches to the middle of the penultimate joint and the lower border of the 3rd joint ends distally in a short acute spine; the spiniform scaphocerite, that bears a small spinule at the inner angle of its base, extends almost to the far end of the penultimate joint, which is twice as long as the last. Flagella barely longer than the carapace. The external maxillipeds project by their terminal joint beyond the antennal peduncle. First

joint with a strong spine at the distal end of its inner margin; the inner margin of the ischium is armed with 3 small spines, of which the 3rd, just beyond the middle, is a little smaller than the two proximal spines. Four slender spines that grow longer distally, occur along the greater distal half of the inner margin of the merus; the carpus that bears a small spine near the distal end of its lower border, is very little longer than the penultimate joint, which is distinctly longer than the dactylus.

The 1st pair of legs fully agree with my description of 1888 (l. c.) of *Ax. spinipes*, especially as regards the chelae. The lower margin of the ischium of the right cheliped, that is the larger one, carries 4 spines, that of the merus, which is 11,5 mm. long and 5 mm. broad, also 4, the three proximal ones of equal size, the 4th, a little longer, just beyond the middle; the lower margin, both of ischium and merus, is hairy, the small tooth on the upper border rudimentary. The chela is 16 mm. long, the palm 9,5 mm. long and 5,5 mm. broad, the palm appears a little less high in proportion to its length than in MILNE-EDWARDS' type, resembling more that of the variety *spinipes*. The outer surface of the palm is covered with squamiform tubercles, on the upper half barely prominent, on the lower smaller, more numerous and more projecting. The ridge on the upper margin of the palm is smooth, that of the lower, on the outer side, crenulate, on the inner hairy till near the tip of the immobile finger. The inner side is also covered with squamiform granules, except near the carpal articulation. The fingers are smooth, presenting, however, some tufts of hair near the upper, respectively the lower border; the dactylus carries two obtuse teeth at the base, of which the first, just near the articulation, is very small; the immobile finger has two teeth, also low and obtuse, one at the base, the other just beyond the middle.

In the left leg (Fig. 12*b*) the tooth on the upper border of the merus, which is 11,5 mm. long and 4,8 mm. broad, is wanting at all, the spines on the lower border of this joint and of the ischium are the same as in the other leg. The chela is 15 mm. long, the palm, 8,5 mm. long and 4 mm. broad, agrees with my description of *Ax. spinipes*, being a little more than twice as long as broad, and narrows slightly towards the articulation of the fingers. The outer side of the palm carries two parallel rows of pits, that include each a squamiform granule and a few short hairs; there are also small tufts of setae near the smooth ridge of the upper and that of the lower border. The inner surface of the palm carries also some squamiform granules, though no pits, except near the articulation of the carpus and of the fingers; tufts of setae occur near the ridge of the upper and of the lower border. The immobile finger is denticulate nearly along its whole length, presenting a low, sharp tooth near the base, two smaller obtuse teeth near the tip and between these and the basal tooth it appears still finer denticulate; cutting-edge of the dactylus almost entire. Both fingers carry also the usual tufts of setae.

The other legs agree with the Upolu type and with my description of *Ax. spinipes* of 1888. The coxae of the legs of the 2nd—4th pair carry a small, sharp tooth near the base of their inner margin; the small tooth at the distal end is in the 2nd and 3rd legs rudimentary. The lower margin of the ischium of the 2nd legs carries 4 small obtuse teeth of equal size at the base and a spine near the distal end. Carpus a little shorter than chela.

The lower margin of the ischium of the 3rd legs carries 3 very small obtuse teeth at

the base. The propodus, 7 mm. long, is a little longer than the carpus, that measures 6 mm.; on the lower border of the propodus are 6 pairs of small movable spinules, of which the inner is a little longer than the outer and a larger spine is inserted at the distal end. The dactylus, half as long as the preceding joint, carries below 10 or 11 spinules and a row of 5 somewhat larger ones occurs on the proximal half of the outer surface.

The lower border of the ischium of the 4th legs carries 2 very small teeth at its base. The propodus is 7,25 mm. long, the carpus 6 mm., the dactylus 3,5 mm.; the lower border of the propodus carries 6 transverse rows of movable spinules, each composed of 3, that decrease in length from the inner to the outer, and a larger spine occurs at the distal end; 8 or 9 similar spinules are inserted on the distal half of the outer surface near the upper border, in 3 or 4 oblique rows. The dactylus carries below a row of 9 small spinules and a row of 10 larger ones occurs on the outer surface.

The propodus of the 5th legs is just as long as that of the 4th, the outer side carries a brush of setae at the distal end but appears for the rest smooth; one observes on the distal half of the inner side a row of 3 pairs of spinules and 5 similar spinules occur in a row on the inner side of the dactylus, that is barely half as long as the propodus.

The genital aperture, about 0,4 mm. broad, is situated at the base of the inner border of the coxae and the scale at their base externally ends in a spine. The sternal plaque (Fig. 12*a*) between the two posterior pairs of legs agrees with that of the Upolu type, for its lateral margins end anteriorly in an acute tooth, that is directed nearly straight forward. The 1st somite of the abdomen is devoid of appendages. Those of the 2nd pair are biramous, the rami foliaceous, lanceolate. Exopod 4,8 mm. long, 4-times as long as broad, presenting its greatest width at $^1/_3$ its length from the base. The endopod is 5,1 mm. long and shows its greatest width of 1,14 mm. at $^1/_4$ its length from the base at the insertion of the stylamblys and the appendix masculina, so that this plate appears a little less broad and slightly longer than the other; the appendix masculina is 1,54 mm. long, 0,28 mm. thick in the middle, a little more than 5-times as long as thick, with obtuse extremity that carries long setae; the stylamblys, placed on the outer side, is 1,6 mm. long, much thinner and slenderer, viz. 0,1 mm. thick in the middle and thickening somewhat distally; for a short distance, viz. of 0,15 mm., it is covered at the distal extremity with cincinnuli. Protopod measuring $^3/_4$ the length of the exopod.

The 3 following pleopods carry only a stylamblys and their protopods gradually decrease in length.

The teeth on the lateral borders of the rostrum are white but darkbrown at their base; those of the lateral and submedian ridges on the gastric area are darkbrown with pale tips, some being white, the teeth of the median ridge and those between it and the submedian ridges are generally white. Stylocerite and scaphocerite darkbrown on their distal half with white tips; antennular and antennal flagella beautifully annulate by blue rings. Spines on ischium and merus of 1st pair of legs darkbrown with white tips; the upper half of the carpus, the palm and the base of the fingers are chocolate brown, the rest of the fingers pale red with white tips. The abdominal terga are marked with three brown flecks on their hinder edge, one in the middle and one on either side; both the anterior and the posterior margin of the 2nd pleura and the posterior margin of the three following are also brown.

The male from Stat. 142 is 40 mm. long, the carapace measuring 15 mm. The submedian rows of teeth on the gastric region (Fig. 12*c*), when compared with the type from Upolu, appear to run somewhat closer by the median row. The sternal plaque (Fig. 12*d*) has also a somewhat different form; the two spines anteriorly are distinctly directed outward, not straight forward and farther distant from the concave anterior border of the plaque. Cephalothorax and abdomen are finer and more sparsely punctate than in the type or than in the adult male from Kur-island and the abdomen carries already a few hairs; the posterior margin of the pleura of the 3rd—5th somites (Fig. 12*e*) is not regularly rounded, but the greater lower half is straight, forming an obtuse angle with the upper part. According to Dr. R. W. Hoffmann who in 1905 kindly examined for me in Göttingen the types both of *Ax. spinipes* and *Ax. affinis*, the two types of *Ax. spinipes* show the same shape of the pleura as in this male from Stat. 142 and the punctation is also the same, in both also the pleura are distinctly concave anteriorly; in the single type (♀) of *Ax. affinis*, however, the pleura are regularly arcuate posteriorly, the punctation is fine and they are not or at least very little concave anteriorly. In the male from Stat. 142 the 1st abdominal somite is also devoid of pleopods. The anterior border of the outer caudal swimmeret is armed only with 5 spinules, of which the last is movable; the outer rib on the upper surface carries 4 teeth and the transverse suture only 13 spinules, of which that at the end of the inner rib is a little longer than the rest.

The stylocerite of the antennal peduncle does not quite reach to the middle of 4th joint and the scaphocerite does not extend to the distal extremity of the latter; the antennular flagella are 14 mm. long, almost as long as the carapace, those of the outer antennae are broken off.

The legs of 1st pair are as much unequal as in the Upolu type, the left being the larger. The merus shows a less slender form than in my figure of *Ax. spinipes* (l. c. fig. 6*b*), that of the larger leg being 7,5 mm. long and 3,2 mm. broad; hand and fingers resemble that figure, excepting the palm being a little shorter in proportion to its height: the chela is namely 11,5 mm. long, the palm 7,25 mm. long and 4,33 mm. high. The fingers are a little more slender than in the Upolu type and the outer surface of the immobile finger is distinctly concave at its base, that is not the case in the former. The right chela is 10,25 mm. long, the palm 6 mm. long, 2,5 mm. high or broad, the fingers measure two-thirds the length of the palm.

This form, in which the submedian rows of the gastric region are situated nearer to the median row than in the Upolu type, may be distinguished as a variety *spinipes*, because it is the same which has been described in 1888 as a new species under that name.

The young male from Stat. 144 is 16,5 mm. long and typical. The scaphocerite reaches to the distal extremity of the 4th joint, the flagella of both pairs of antennae are marked with blue rings as in the adult male from Kur-island. The left chela is the larger, 5 mm. long, the palm is 3 mm. long and 1,7 mm. high or broad; the other chela is 4 mm. long, the palm 2,4 mm. long and 0,8 mm. high. The outer side of the palm of the larger chela is covered with squamiform tubercles as in other specimens, that of the smaller chela is smooth; the distal half of the palm has a brown colour, the fingers are white. Outer maxillipeds blue, the last joint excepted. As regards the form of the denticulated area on the gastric region, the coarse punctation of the body and the shape of the pleura, this specimen resembles the Upolu type; the sternal plaque, however, agrees with that of the male from Stat. 142.

The male from Ambon belongs again to the variety *spinipes*, it is 34 mm. long, the carapace measuring 12,5 mm. Unfortunately only one leg of the 2nd and one of the 3rd pair are present, the other legs are wanting. The antennal flagella, measuring 16 mm., are a little longer than the carapace and half as long as the body; like the antennular flagella that are 11 mm. long, they are bluish annulated. The sternal plaque resembles that of the male from Stat. 142.

The two young males from Stat. 213 apparently belong also to the variety *spinipes*, as regards the fine and rare punctation of carapace and abdomen, the shape of the sternal plaque and of the pleura, but the right chela which is the larger, closely resembles that of the *serratifrons*-type; this chela is in the larger specimen that measures 17,5 mm., 6 mm. long, the palm 4,25 mm. long and 2,4 mm. broad. The outer surface is everywhere covered with small granules. There is no trace of the fine blue colour, observed in the young male from Stat. 144; the distal border of the carpus and that of the palm of the larger chela are reddish-brown, the fingers white, other colours do not occur. The other leg of 1st pair is wanting. The other specimen is uncoloured and has lost the larger leg of 1st pair.

The male from the Lucipara-islands, 39 mm. long, the carapace measuring 14,5 mm., belongs to the variety *spinipes*. The antennular flagella are 13 mm. long, those of the outer antennae 17 mm.; the scaphocerite of the antennal peduncle reaches almost to the distal end of 4th joint. The outer caudal swimmeret is armed with 6 spines on its anterior border, besides the movable distal spine; the transverse suture carries only 11 spinules that are nearly of the same size, the spinule at the end of the inner longitudinal rib being not larger than the rest. Though this specimen bears no legs of the 1st pair, one leg is lying loose in the tube: this leg (Fig. 12*f*), apparently the smaller one, appears considerably more slender than the smaller leg of the male from Stat. 142. The merus is 7 mm. long and 2,25 mm. broad, the dorsal tooth included. The chela is 8,33 mm. long, the palm 5 mm. long and 1,75 mm. broad in the middle; the fingers measure $^2/_3$ the length of the palm. The palm appears on its outer side distinctly ridged near the upper and near the lower border and on these ridges tufts of setae are implanted; the outer surface is smooth, but one observes two parallel rows of large rounded pits or impressions, each of which bears a small seta. Except the fingers this leg shows an olive-green colour, darker on the distal end of carpus and palm; fingers red with white tips.

The young specimen, probably a male, from Stat. 248 is typical, though the punctation of the branchial regions is not very dense; all colours of this individual which is 14 mm. long, are got pale. The fingers of the larger chela, situated on the right side, are very sharp and cross one another; the lower finger has one tooth in the middle, the other is unarmed. The palm presents some coarse puncta, each with a granule in it, near the upper border and near the lower, whereas it is smooth and shining in the middle.

The egg-laden female from Stat. 301 is only 23 mm. long. The denticulated area on the gastric region (Fig. 12*g*) resembles that of the *serratifrons*-type; carapace and abdomen show, however, a rare and fine punctation and the posterior border of the pleura runs like in the variety *spinipes*. The sternal plaque resembles that of this variety, its antero-lateral angles, though sharp, do, however, not end in a spine. The 1st abdominal somite carries a pair of

small, uniramous appendages. The antennular peduncle reaches almost to the distal end of the 4th joint of that of the outer antennae, the scaphocerite extends to the far end of that joint. The left leg (Fig. 12*i*) of 1st pair is the larger. The spinule on the upper border of the merus is present; the lower border of both ischium and merus is armed each with 4 spines. Chela 7,25 mm. long, the palm 5 mm. long and 3 mm. broad, as well in the middle as at the articulation of the fingers. Both the outer and the inner side of the palm are covered everywhere, i. e. also in the middle, with numerous, small, squamiform granules. The palm of the smaller right leg (Fig. 12*k*) is a little higher in proportion to its length than in the Upolu type; the chela, indeed, is 6,5 mm. long, the palm 3,75 mm. long and 2 mm. broad in the middle, being barely twice as long as broad. Upper and lower border distinctly ridged, the palm is here also everywhere covered, as in that of the larger leg, with squamiform granules.

In both legs of 1st pair the palm has a dark chocolate colour, that of the larger chela with a large pale spot on the proximal half of both outer and inner side; the fingers are beautifully orange at their base, for the rest white. The carpus is of a paler chocolate, except near the articulation with the merus that has a white colour; upper half of merus and ischium slate-coloured, lower white and their spines are red at their base. The rostrum, the eyepeduncles and those of the two pairs of antennae are slate-coloured, the spines on the latter and the small teeth on rostrum and gastric region red. Abdomen pale brown above, the hind border of the terga white in the middle, dark coloured on either side, pleura slate-colour.

The eggs are small, globular, 0,32 mm. broad.

Perhaps this specimen may be considered as representing another variety of this species and it is noteworthy that the size of this egg-laden specimen is is but one-third that of the adult male from Kur-island.

We may conclude from the preceding description that *Axiopsis serratifrons* (A. M.-Edw.) is a rather much variable species.

Geographical distribution: Hawaiian Islands (A. Milne-Edwards, Rathbun); Fanning Island (Edmondson); Upolu, Samoa Islands (A. Milne-Edwards); Angaur, Palau Islands (Sendler); Noordwachter Island, Java Sea (de Man); Amboina (de Man, Zehntner); Hulule, Male Atoll, Maldives (Borradaile); Salomon Atoll, Chagos Archipelago (Borradaile); Obock (Nobili); Red Sea (Nobili).

2. *Axiopsis (Axiopsis) consobrina* de Man. Fig. 13—13*c*.

Axiopsis consobrina J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereeniging (2) Dl. IX, 1905, Afl. 3 en 4, p. 595.

Stat. 105. July 4. Lat. 6° 8′ N., long. 121° 19′ E. North of Sulu Island. 275 m. Coralbottom. 1 young specimen.

Stat. 204. Sept. 20. Lat. 4° 20′ S., long. 122° 58′ E. Between islands of Wowoni and Buton; northern entrance of Buton-strait. From 75—94 m. Bottom sand with dead shells. 1 female without eggs.

Stat. 305. Febr. 8, 1900. Mid-channel in Solor-strait. Off Kampong Menanga 113 m. Bottom stony. 1 male.

A new species, closely related to *Ax. serratifrons* (A. M.-Edw.) and especially to the

variety *spinipes* de Man, but no doubt distinct. The female has lost all its legs excepting those of the 3rd pair, therefore the male from Solor-strait will be described.

The male from Stat. 305 is 29,5 mm. long from tip of rostrum to end of telson, the carapace being 10,3 mm. long, the abdomen 19 mm. The triangular, acuminate rostrum (Fig. 13) that projects almost horizontally forward, being very slightly directed downward, reaches barely beyond the distal end of 1st joint of antennular peduncle. The lateral margins of the rostrum, that appears a little less broad at its base than that of *Ax. serratifrons*, are armed each with *five* subacute teeth that are directed forward and the foremost of which is a little farther distant from the slightly upturned tip than from the 2nd. The lateral continuations on to the gastric region diverge first a little backward, then on the middle of their length curve regularly inward, approximating one another and not reaching to the cervical groove; they are armed each with 9 sharp teeth, that gradually decrease in size backward. The foremost of these teeth is a little less distant from the 2nd than from the 1st tooth on the lateral borders of the rostrum. As in *Ax. serratifrons* the gastric region is slightly carinate or ridged in the middle line and this ridge carries 13 sharp teeth; the foremost tooth is much smaller than the following and situated at the same niveau as the 2nd pair of lateral rostral teeth. The last tooth of the median ridge is situated just posterior to a line that unites the last pair of teeth on the outer or lateral ridges; the median ridge is neither continued anteriorly beyond the foremost tooth nor posteriorly beyond the hindmost, not reaching to the cervical groove. Like in *Ax. serratifrons* and like in the variety *spinipes* a submedian ridge runs between the median row of teeth and the lateral rows; each submedian ridge carries 7 or 8 similar, equidistant spines. In their anterior half the submedian ridges run distinctly nearer to the middle line of the carapace than to the lateral ridges, but, though approximating backward very slightly the middle line, they are, however, posteriorly farther distant from the latter than from the lateral rows. Like those of the rostrum also the spines of the gastric area are all directed straight forward. Different from *Ax. serratifrons* and its variety *spinipes* no small teeth occur on the gastric region between the longitudinal rows. Near and between the teeth of the rostrum and the flattened gastric area a few fine hairs are implanted. Cervical groove deep, its lateral parts do not reach to the anterior border of the carapace; the groove is 7 mm. distant, in the middle line, from the pointed apex of the rostrum, just twice as far as from the posterior end of the carapace, which is smooth, barely punctate. Antennal tooth very small, acute, situated just above the insertion of the antennal peduncle and curved inward.

The abdomen, almost twice as long as the carapace, resembles that of *Ax. serratifrons* var. *spinipes*, except as regards the shape of the pleura. In the Upolu type of *Ax. serratifrons* A. M.-Edw. (Confer p. 73) the regularly rounded posterior margin of the 3rd—5th pleura makes a distinct angle with their lower border and this is also the case in the variety *spinipes*; even on the pleura of the 2nd somite they make an obtuse angle with one another. In *Ax. consobrina* the lower angle of the pleura of the 1st somite is obtuse, presenting no small tooth; the regularly rounded, posterior margin of the pleura of the 2nd somite curves regularly into the lower border, which is also the case in the pleura of the 3rd; in those of the 4th an angle is still barely distinguishable, but only in the 5th an obtuse angle is observed. The lower angle of the pleura of the 6th somite is rounded. Like in *Ax. serratifrons* a minute sharp

tooth occurs at the limit between the anterior and the lower border of the 3rd—5th pleura. The pleura are barely a little concave. The abdominal terga and pleura are smooth and glabrous, a very fine punctation is hardly discernible by means of a lens.

The caudal fan resembles much that of *Ax. serratifrons* var. *spinipes*, even in minute particulars, but the two pairs of spines on the telson are situated more forward (Fig. 13*a*).

The eyepeduncles that reach to the distal third of the rostrum, are of the usual form, rounded distally; their black pigmented, distinctly faceted cornea occupies more than half their length.

The inner antennae are 12,5 mm. long, a little longer than the carapace and about two-thirds the length of the abdomen. The 2nd and the 3rd joints of their peduncle which is 2,5 mm. long, are of the same size and length; the longer inner flagellum is 9,8 mm. long, 4-times as long as the peduncle, almost as long as the carapace; the outer flagellum is a little shorter, measuring 9,1 mm. The inner flagellum is composed of 61 joints; the proximal joints are nearly as long as thick or sometimes even a little thicker than long, rarely slightly longer than thick, those of the distal half are nearly twice as long as thick; the shorter flagellum consists of 53 joints that are a little thicker than those of the inner but that show about the same form.

External antennae 18 mm. long, nearly as long as the abdomen. The outer, upper border of the 2nd joint of the peduncle, that is 4 mm. long, ends in a strong spine, that reaches about as far forward as the proximal 3rd part of the penultimate joint and the lower border of the 3rd ends in a strong spine that is directed inward. The 4th joint, 1,45 mm. long, is 3-times as long as broad and fringed below with ciliated hairs; there is a strong spiniform scaphocerite that reaches almost to the distal extremity of the penultimate joint and that carries near the base of its inner margin a spine; this spine measures $^1/_6$ the length of the scaphocerite and is directed forward and inward. The last joint is somewhat more than half as long as the penultimate. The flagella are probably composed of 75—80 joints, that at first are broader than long, the following as long as thick, finally longer than thick.

External maxillipeds pediform, similar to those of *Ax. serratifrons*. Lower border of the ischium with 2 or 3 spines on its proximal half, that of the merus with 5 spines that increase in length distally and one spine at the distal end of the lower border of the carpus; crest on the inner side of the ischium with 15—20 acute teeth.

Of the anterior legs the right (Fig. 13*b*) is the larger. This larger leg closely resembles that of the male of *Ax. serratifrons* (A. M.-Edw.) var. *spinipes* de Man from Stat. 142, described p. 78, excepting the granulation of the palm. The lower border of the ischium carries 3 sharp spines increasing in length distally. The merus, 5 mm. long and 2,25 mm. broad, a little more than twice as long as broad, is armed on the lower border of its inner side with 5 acute strong spines about of the same size and with one smaller spine, directed forward, on the upper border, just in front of the 5th of the lower border. Carpus unarmed. The chela is 9,4 mm. long, the palm 5,4 mm. long and 3,5 mm. broad in the middle; in its outer appearance this chela resembles that of the male of the variety *spinipes* from Stat. 142. Both the upper and the lower border are ridged, the ridge on the upper border is smooth and entire, that of the lower is somewhat granular externally midway between the tip of the immobile

finger and the carpal articulation. The slightly convex outer side of the palm is smooth, except near the flattened base of the immobile finger and near the articulation of the dactylus, the palm being here covered with some smooth, rounded granules and hairs, more numerous near the base of the immobile finger than near the articulation of the dactylus. The somewhat compressed fingers, which are a little shorter than the palm, have pointed tips that cross one another and that carry the usual tufts of hair. Each finger has a larger tooth near its base and between this rather truncate tooth and the tip a few much smaller teeth, that are more distinct on the immobile finger than on the dactylus. The equally convex, inner side of the palm carries some granules near the upper border, near the articulation of the dactylus and near the base of the immobile finger, but the greater part is smooth. The fingers, though hairy, are also smooth.

The left leg (Fig. 13*c*) is slender. The lower border of the merus, also 5 mm. long but only 1,75 mm. broad, is armed with 6 spines, the upper with one. The chela has another form than that of the male of the variety *spinipes* from Stat. 142. It is 8,25 mm. long, the palm 4,25 mm. long and 1,8 mm. broad near the carpal articulation; the palm that narrows a little distally, is barely longer than the slender fingers that shut together and the pointed tips of which are crossing one another. Both the upper and the lower border are ridged, the ridges are smooth and that of the lower is continued to the tip of the immobile finger. Both the outer and the inner surface of the palm are distinctly a little convex and perfectly smooth; one observes, however, a longitudinal row of 5 or 6 puncta just below the middle of the outer surface and a few above them; in each punctation a few microscopical hairs are implanted. The fingers are finely denticulate along their whole length; among the small teeth of the immobile finger that are more conspicuous than those of the dactylus, a few larger teeth alternate with smaller ones.

The legs of the 2nd and 3rd pairs are wanting, except the coxae that carry an acute tooth near the middle of their inner margin, whereas the distal end is also sharp. The coxae of the 4th pair are armed with 2 or 3 sharp teeth on their inner border and their slender meri carry an acute tooth at the far end of their lower margin.

The sternal plaque between the 4th pair of legs terminates at either side, anteriorly, in a sharp spine and is anteriorly hollowed out; it is here much broader than at its base and bears some resemblance to that of *Ax. spinipes*. Like in this variety the small scale on the outer side of the 5th legs ends anteriorly in a small spine.

The first pair of abdominal appendages are small and uniramous. Those of the following somites resemble the appendages of *Ax. tenuicornis*. So consist those of the 2nd pair of a protopod, 2 mm. long and 5-times as long as thick; it carries two foliaceous, though narrow, lanceolate rami. The endopod is 2,45 mm. long and carries at $^1/_3$ its length from the base an appendix masculina and on the outer side of it an equally slender stylamblys; the appendix masculina, 0,9 mm. long and 0,073 mm. thick, carries on the distal half and on the tip long hairs, whereas the barely longer stylamblys bears a few cincinnuli at its tip. Exopod little shorter, 2,2 mm. long. The other pleopods bear only a stylamblys.

The female from Stat. 204 has almost the same length as the described male, measuring 28 mm., carapace 10 mm., abdomen 18 mm. The thoracic legs are lost, except the right of

the 3rd pair; the ischium carries two spines on its lower margin and a sharp tooth stands at the far end of the lower border of the merus.

The young specimen from Stat. 105 is 21 mm. long and differs from the two others by the characters of the denticulated area on the gastric region. The lateral borders of the rostrum that reaches to the middle of the 2nd joint of the antennular peduncle, are armed with 4 sharp teeth, their continuations on to the gastric region with 8 or 9 more that are much smaller. The median ridge carries 11 or 12 teeth; the foremost stands at the niveau of the anterior margin of the carapace and the 4 anterior teeth are much larger than the rest. The two submedian ridges are armed each with 9 sharp teeth that slightly decrease in size backward; the two ridges extend as far backward as the middle one and are somewhat shorter than the lateral rows. The two submedian ridges that converge distinctly backward, are on their anterior half farther distant from the midline than from the lateral rows and between the submedian ridges and the median row one observes, at either side, 8—10 small sharp teeth. The denticulated area reminds therefore of that of *Ax. serratifrons*, but in this species the submedian ridges run parallel. For the rest this specimen apparently agrees with the preceding. Telson, without the median spine of the posterior margin, 3 mm. long and one and a half as long as broad; the anterior pair of spinules on the upper surface is situated at one-third the length of the telson (the median spine excluded) from its anterior margin, whereas the posterior pair is inserted just in the middle; the median spine of the posterior border is 0,4 mm. long, about $^1/_4$ the width of the latter.

This specimen carries the right leg of 2nd pair. The lower margin of the ischium is armed with 3 spines, of which the 3rd, near the distal end, is somewhat larger than the two preceding; that of the merus carries also 4 spines, the 3rd just beyond the middle, the 4th at the distal end and there is a spine at the distal end of the lower border of the carpus. Legs of the 5th pair very slender.

3. *Axiopsis (Axiopsis) tenuicornis* de Man. Pl. VII, Fig. 14—14*l*.

Axiopsis tenuicornis J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereeniging. (2) Deel IX, Afl. 3 en 4, 1905, p. 596.

Stat. 5. March 10. Lat. 7° 46′ S., long. 114° 30′.5 E. 330 m. Bottom mud. 1 female without eggs.

This apparently new *Axiopsis* was collected at the same locality where no less than three new species of the genus *Callianassa* and the remarkable *Meticonaxius monodon* were discovered, so that this Station, situated between Ceram and the Kei Islands, should be considered as one of the most interesting.

Body, measured in the middle line from tip of rostrum to end of telson, 21 mm. long, carapace 7,5 mm. long, abdomen 13,5 mm. The triangular, slightly concave and acuminate rostrum (Fig. 14), that reaches almost to the distal end of the 2nd joint of the antennular peduncle, measures almost one-fifth the length of the carapace, the rostrum included. The lateral margins that are fringed with short setae, are armed each with two sharp spines, of which the posterior is a little longer than the anterior; on the left side the anterior spine is placed about in the middle of the lateral margin, the other near the base of the rostrum,

on the right side both are placed a little farther forward. The upper surface of the carapace appears slightly convex longitudinally from before backward, but the rostrum projects horizontally forward. The prolongations of the lateral margins of the rostrum on to the gastric region that, like in other species, first somewhat diverge and afterwards curve inward, are armed each with four similar spines as those of the rostrum; the foremost, just behind the anterior border of the carapace, is situated, on the right side, one and a half as far from the posterior spine of the rostrum as from the 2nd, on the left the difference between these distances is less considerable. The 3rd spine on the lateral rows is about as far distant from the 2nd as from the 4th and these distances are nearly one and a half as long as the distance between the 1st or foremost and the 2nd. The gastric region is distinctly carinate in the middle line and this rather sharp carina that does not extend on to the rostrum nor posteriorly to the cervical groove, carries four nearly equidistant spines, the foremost of which, a little larger than the rest, is placed immediately behind the foremost pair of the lateral spines of the gastric area. On either side of the median carina the gastric region carries a submedian row of similar spines, four on the right, three on the left (a probably accidental difference); the foremost pair is placed immediately in front of the 2nd spine of the median carina. All these spines of the rostrum and the gastric region are sharp and curved forward. The distinct cervical groove is 2,4 mm. distant from the convex posterior extremity of the carapace, this distance being about $^1/_3$ the length of the latter. The anterior border of the carapace carries a very small, sharp antennal tooth or spine, just above the antennal peduncle and the angle that the anterior border makes with the lower, is also sharp.

Abdomen 1,8-times as long as the carapace, broadest at the 2nd somite, that is 3,2 mm. broad and then it narrows regularly backward. The exposed part of the 2nd tergum is 1,7 mm. long in the middle line; the 3rd—5th terga are of approximately equal length, the length diminishing very little. The 1st somite appears in the middle line much shorter than the 2nd and its anterior border is deeply concave; the anterior border of the pleura of the 1st somite is slightly concave above and the lower angle rather obtuse. The pleura of the following somites are well developed, overlap one another and are rounded both anteriorly and posteriorly. The 6th somite (Fig. 14*a*), that appears a little more convex longitudinally from before backwards than the preceding, is 2,3 mm. long, distinctly longer than the 2nd; it shows its greatest width of 2,4 mm. at $^1/_4$ its length from the anterior border and the slightly convex lateral borders converge somewhat backward. The nearly straight posterior margin of the 6th somite carries, like that of the preceding somites, 2 or 3 long setae at either side of the middle; the abdomen appears smooth, somewhat punctate and glabrous.

Telson (Fig. 14*a*) 2,5 mm. long, without the median spine of the posterior border, and 2,62 mm., when it is included; the telson is thus a little longer than 6th somite. At $^1/_4$ its length from the anterior margin the lateral borders bulge out laterally, so that the telson shows here its greatest width of 1,95 mm.; they diverge further slightly backward and make obtuse angles with the regularly convex, posterior border, so that the telson is 1,75 mm. broad between the postero-lateral angles. The telson is thus $^1/_4$ longer than broad anteriorly and more than $^1/_3$ longer than broad posteriorly. The lateral borders carry 2 or 3 very short, conical spines on their anterior half and they are fringed, like the

posterior border, with ciliated setae. The posterior border is armed in the middle with a short acute spine, attached to the lower surface. Just near the posterior margin the telson carries on each side a transverse row of three movable spines, that are equidistant; the shortest of the three, 0,13 mm. long and twice as long as those of the lateral margin, is inserted at the postero-lateral angle, the 2nd is a little longer and the 3rd that measures 0,22 mm., is the longest of the three and projects by half its length beyond the posterior margin. At the level of its greatest width the upper surface carries an arcuate transverse row of short setae in the middle and on either side near the lateral margins a transverse straight row of 7 or 8 shorter ones. At the distance of 1 mm. from the anterior border, just before the middle, the upper surface carries at either side another transverse series of short bristles, between which one observes a short conical spine, 0,05 mm. long, as long as those of the lateral margins; the two spines are 0,25 mm. distant from one another. A little, viz. 0,28 mm., farther backward the telson carries at either side a similar spinule of the same size; these spinules are, however, 4-times as far distant from one another, viz. 0,9 mm., and each is inserted amidst a transverse row of 4 or 5 short bristles. Quite posteriorly, finally, near the posterior border, one observes a transverse row of short setae between the middle line and the three movable spines.

Uropods foliaceous, as long as the telson when extended backward, basal joint small and unarmed. Outer uropod 2,5 mm. long, just as long as the telson, and 1,44 mm. broad a little beyond the middle; it is obovate and a little more than half as broad as long. Whereas the rounded apical and the inner border curve regularly into one another, the anterior margin runs nearly straight; one observes a triangular notch (Fig. 14*b*) at the anterior end of the transverse suture and 3 or 4 small, sharp teeth occur on the distal half of the anterior border behind that notch. The transverse suture is straight and armed, along its whole length, with 8 or 9 small sharp teeth, nearly all of the same size. The inner uropod is just as long and just as broad as the outer, it has an oval shape, but the anterior border that ends distally in a sharp tooth, is straight. The longitudinal midrib carries four almost equidistant spines, each with 1 or 2 setae near it, the last, not far from the distal margin, being a little larger than the rest. The anterior border is fringed with short simple hairs; the distal border carries on its outer side several short stiff bristles, on the inner side longer and more slender ones and both the distal and the inner border are fringed with feathered setae.

The rounded eyepeduncles reach a little beyond the middle of the rostrum; the distinctly faceted, pale brown coloured cornea occupies more than half the length of the peduncle and the eyepeduncles are here somewhat thicker than at their base.

Measured on the lower side of the body, where they are entirely visible, the internal antennae (Fig. 14) prove to be 6,75 mm. long, a little shorter than the carapace. The 1st article of their peduncle, that is 1,8 mm. long, has a length of 1,04 mm. and is, like in other species, considerably thickened, excepting the distal 4th part. The 2nd article, the shortest of the three, is 0,4 mm. long and 0,26 mm. thick, the 3rd is 0,46 mm. long and 0,24 mm. thick. The inner flagellum of the left antennula measures 4,95 mm., almost 3-times as long as the peduncle; it is composed of 28 joints. Except the 2nd which is just as long as thick, these joints are all longer than thick, the joints in the middle of the flagellum being about $2^1/_2$-times, those near the extremity 4-times as long as thick. So e. g., viewed from above, the

1st joint appears to be 0,12 mm. long and a little less thick, the 2nd 0,08 mm. long and just as thick, the 10th 0,18 mm. long and 0,075 mm. thick in the middle, the 21th joint 0,23 mm. long and 0,056 mm. thick, whereas the tapering terminal joint is 0,11 mm. long and 0,025 mm. thick at its base. It is, no doubt, an individual abnormity that the inner flagellum of the right antennula, though also composed of 28 joints, is a little shorter, being only 4,75 mm. long. The slender joints carry some setae of unequal length near their distal extremity; some setae are short, other ones are longer, sometimes as long as 4 or 5 joints taken together, a few on the proximal joints are ciliate. The outer flagellum, 4,4 mm. long, is little shorter than the other; it is also formed by 28 or 29 joints that much resemble those of the inner, except that they are a little thicker; so e. g. the 10th joint is 0,17 mm. long and 0,08 mm. thick in the middle, the 21th joint is 0,21 mm. long and also 0,08 mm. thick, the terminal joint 0,1 mm. long and 0,026 mm. thick at its base; the eight last joints are provided with olfactory filaments. The antennular peduncle reaches to the middle of the penultimate joint of that of the outer antennae.

The antennal peduncle proves to be 3,4 mm. long, measured in a lateral view of the animal, in which the 1st joint is also visible, but only 3 mm., when the animal is looked at from above. The 1st joint carries a small spine at the distal end of its lower border. A small, acute spine, barely reaching beyond the distal end of 1st antennular article, occurs at the distal end of the lower border of the 2nd joint; the external upper margin ends in another slender, much larger spine, the stylocerite, that reaches as far forward as the 2nd antennular article. The 4th or penultimate joint, 1,8 mm. long and 0,2 mm. thick in the middle, is very long and slender, 9-times as long as thick; the movable scaphocerite is just as long as the penultimate joint, reaching to its distal extremity, and looks like a long, slender, acuminate spine. The terminal joint is short, 0,5 mm. long, measuring not yet $^1/_8$ the length of the penultimate, that is fringed with ciliate hairs on its lower border. Flagella lost. It is from the slender shape of the antennal peduncle that the specific name of *tenuicornis* is derived.

The external maxillipeds are slender, pediform, reaching nearly as far forward as the penultimate joint of the antennal peduncle; coxa and basis carry each a small spine at the distal end of their lower border and the ischium is armed along its proximal half with 4 spines of equal length. Like in other species this joint is armed at the inner side with a prominent crest that carries 25—30 acute teeth and this crest grows slightly higher distally. The merus (Fig. 14*c*), 1,15 mm. long, when measured in the middle, shows its greatest width of 0,43 mm. not far from its base and narrows towards the carpal articulation; the somewhat arcuate lower margin is armed, in the middle, in the left maxilliped (Fig. 14*c*) with four slender spines that increase in length from the first that is 0,12 mm. long to the fourth, which measures 0,4 mm., being 3-times as long as the posterior one; in the right maxilliped there are but three spines on the merus. The carpus that measures $^3/_4$ of the length of the merus, carries a small spine at the far end of its lower border; the propodus is about as long as the carpus, the terminal joint is somewhat shorter and all the joints are fringed with long hairs.

The 1st pair of legs are very unequal, the right being the larger. The right leg (Fig. 14*d*), about 11 mm. long, outreaches by its chela the distal extremity of the antennal peduncle. The anterior border of the coxa carries near the inner margin 3 small spinules that are placed close

near one another; on the left leg only one spinule seems to occur. The lower border of the ischium of the larger cheliped has a small spine near the middle and a larger one near the distal end. The merus, 3,6 mm. long, is 0,56 mm. broad at its proximal extremity and shows its greatest width of 0,96 mm. about at $^1/_3$ its length from the distal extremity; the upper border carries here a spine that is curved forward and as long as the distal spine of the ischium. The lower border of the merus which is almost 4-times as long as broad, is armed with 4 acute spines; the three first are nearly of equal length and a little smaller than the distal spine of the ischium, the 4th is a little larger than the spine of the upper border and is placed immediately behind it; the lower border carries also a few hairs. The triangular carpus is 1,2 mm. long and nearly just as broad, viz. 1,1 mm., at the articulation with the hand; this joint measures $^1/_3$ the length of the merus, carries a few setae near the upper and lower border and is unarmed. The chela, 3,8 mm. long, appears nearly as long as the merus; the palm, 2,14 mm. long, is little longer than the fingers and 1,36 mm. broad, being one and a half as long as broad. Its straight upper border is armed with two small, acute teeth behind one another at the distal end. The hairy fingers shut close together and the dactylus (Fig. 14*e*) bears a longitudinal row of three slender spines on the proximal part of its upper border. Both fingers, the pointed tips of which cross one another, carry several low teeth, a large, obtuse, double tooth is placed at the base of the dactylus and the other teeth are also low and subacute.

The left leg (Fig. 14*f*) is much more slender, but barely shorter than the right. The lower border of the ischium is armed with 6 acute spines, the last of which near the distal end is considerably larger than the preceding, that are small. The merus, 3,7 mm. long, is 0,5 mm. broad at its proximal extremity and presents its greatest width of 0,76 mm. at a distance of 1 mm. from the carpal articulation; it is more slender than the merus of the right leg, being almost 5-times as long as broad; the upper border bears also a spine at the greatest breadth but the lower is armed with six spines, of which the 1st is very small, the four following are a little larger and equal, the 6th is 3-times as long as the 1st and nearly as long as the spine of the upper border, just behind which it is placed. The carpus is 1,5 mm. long, 0,58 mm. thick at the distal end, nearly 3-times as long as thick and unarmed. Chela 3,36 mm. long, a little shorter than the merus, palm 1,3 mm. long, 0,54 mm. broad at its proximal end and 0,75 mm. at the articulation of the fingers; a minute sharp tooth occurs at the distal end of the upper border (Fig. 14*g*). The slender fingers, the pointed tips of which cross one another and that shut together, are one and a half as long as the palm. The dactylus carries a single acute tooth at the base of its upper border and several low, small, sharp teeth occur on the cutting-edges of both fingers, except at their base; these teeth are more numerous on the immobile finger than on the dactylus, they are very small and acute, but the 5 distal teeth of the immobile finger (Fig. 14*h*) and the 3 distal ones of the dactylus are movable, a little larger and conical. The fingers are hairy, the palm and the other joints carry also some long setae.

The legs of the 2nd pair (Fig. 14*i*) are equal, much shorter and smaller, projecting only by their fingers beyond the distal extremity of the antennal peduncle. The coxa carries a very small spine at the far end of its inner border and a larger does exist on the middle of the

inner border of the next joint. The lower border of the ischium is armed with 5 spines, the 1st of which is very small, the three following are a little larger and the 5th, near the distal end, 0,32 mm. long, is the longest of all. The slender merus is 3,2 mm. long, 0,42 mm. broad in the middle, about 8-times as long as broad; it is distally just as broad as in the middle. Whereas the upper border is entire, the lower carries 6 or 7 spines; the 1st is very small, the following grow gradually longer until the 6th that is placed just beyond the middle, the 7th, a little smaller than the 6th, stands at the distal end. The carpus is 1,3 mm. long and its greatest width near the distal end is $^1/_3$ its length; the lower border has a spine near the distal end, which is as large as the last spine on the lower border of the merus. The chela is 1,9 mm. long, almost one and a half as long as the carpus; the palm is 0,72 mm. long and the regularly tapering fingers, that bear 8 or 9 small teeth on their distal half, are almost twice as long as the palm. The chela is 0,52 mm. broad near the articulation of the fingers and appears thus nearly 4-times as long as broad. Both the upper and the lower border of the chela are fringed with setae that are very long proximally and gradually decrease in length towards the tips of the fingers; the preceding joints are also fringed with hairs.

The slender legs of the 3rd pair (Fig. 14*f*) are a little longer than those of the 2nd. The merus, that is 3,6 mm. long, and that widens slightly distally, is 0,4 mm. broad in the middle, 9-times as long as broad; it has a small spine near the distal end and a much smaller one at $^1/_3$ its length from the proximal extremity. The carpus is 1,45 mm. long and 0,35 mm. broad, 4-times as long as thick; the propodus is 2 mm. long and 0,28 mm. broad in the middle, almost 8-times as long as thick and it carries a small movable spine at the far end of its lower border. The regularly tapering dactylus, finally, is 0,9 mm. long, almost half as long as the preceding joint and, like the lower border of the propodus, fringed on both sides with long setae. The two last pairs of legs are wanting.

The sternal plaque between the legs of the 4th pair is furrowed in the middle line of its posterior half and the anterior margin appears subacute in the middle; the lateral angles are obtuse.

The abdominal appendages of the 1st somite are slender, uniramous; those of the following somites are biramous, the two rami foliaceous, narrow, protopod rather long, endopod with a very slender stylamblys. So e. g. the protopod of the 2nd pair (Fig. 14*k*) is 1,6 mm. long and 0,3 mm. thick in the middle, where it carries a few outstanding setae, and appears thus 5-times as long as thick; the exopod is 1,52 mm. long, narrow, showing its greatest breadth of 0,26 mm. not far from the base, 6-times as long as broad and tapering to the pointed tip. The endopod, 1,8 mm. long, slightly longer than the other ramus, carries the slender stylamblys at a distance of 0,8 mm from the base; until to the insertion of the stylamblys it is 0,26 mm. broad, but then it narrows regularly to the tip. The stylamblys is 0,65 mm. long, 0,048 mm. thick, about 14-times as long as thick and furnished with a few cincinnuli at its distal end.

4. *Axiopsis (Axiopsis) pailoloensis* (Rathb.). Pl. VII, Fig. 15—15*b*.

Axius pailoloensis M. J. Rathbun, The Brachyura and Macrura of the Hawaiian Islands, Wash. 1906, p. 893, fig. 49.

Stat. 204. Sept. 20. Lat. 4° 20′ S., long. 122° 58′ E. Between islands of Wowoni and Buton; northern entrance of Buton-strait. From 75—94 m. Bottom sand with dead shells. 1 young female.

It is with some doubt that this specimen is referred to the above-named species, not only because the legs of the 1st pair are wanting, but especially because telson and uropods do not agree with Miss RATHBUN's figures. The only type on which this species was founded, was 28,7 mm. long (carapace 11,7 mm., abdomen 17 mm.), in the specimen from Buton-strait these numbers are respectively 12,44 mm. (5,04 mm. and 7,4 mm.); they prove the abdomen to be one and a half as long as the carapace. The tip of the rostrum (Fig. 15) is unfortunately broken off, but reached no doubt to the distal extremity of 2nd antennular article. Instead of two as in the type, the rostrum carries three pairs of side spines that alternate with one another, unfortunately the tips of two or three are broken off; between the spines long hairs on the borders. Greatest width of carapace a little more than $^1/_3$ its length, rostrum included, distance between tip of rostrum and cervical suture 3,2 mm.

The five carinae on the gastric region agree with those of the type. The outer carina, a continuation of the rostral border, carries two spines, of which the anterior, at the base of the rostrum, is twice as large as the posterior, larger than the rostral spines and much larger than the other spines of the gastric region; the outer carinae diverge till to the posterior spine and hence slightly converge backward, ending at some distance from the cervical groove. The anterior of the 2 spines of the median carina is half as far distant from the line that unites the tips of the anterior spines of the outer carinae as the rostrum is long; the much smaller posterior spine is situated in the transverse line that unites the posterior spines of the outer carinae. The submedian carinae end anteriorly in a small spine, a line uniting these two spines is just as far distant from the anterior as from the posterior spine of the median carina; posterior to their terminal spine the submedian carinae carry, the right 3 or 4, the left 2 or 3 small spines. Midway between the median carina and the terminal spines of the submedian rows another small spine is observed and these four spines are nearly of equal size. At either side of the anterior spine of the median carina a minute tubercle and just in front of the posterior spine of the outer carinae a similar minute tubercle occurs, that are not mentioned by Miss RATHBUN. Tufts of setae between the carinae.

Sides of carapace covered with small tubercles or granules.

On the upper surface of the abdominal somites tufts of long hairs are implanted. Pleura of the abdominal somites subacute, anterior margin of 3rd, 4th and 5th somite with a small acute tooth in the middle. The telson of the type specimen is described as being "a little longer than wide", in the young specimen from Buton Strait, however, it is 1,4 mm. long and 0,98 mm. broad, almost one and a half as long as broad, presenting its greatest width at the anterior fifth (Fig. 15*a*). In the cited figure 49*c* the lateral margins of the telson appear slightly convex in their middle, posterior to the wider anterior fourth part and quite unarmed; in the present specimen, however, they are distinctly dentate like in *Axius rudis* Rathb. (l.c. p. 894). The small 1st tooth is situated at the anterior fifth; the 3rd just half as far from the tooth or spine at the posterior extremity as from the 2nd, a short way behind the 2nd the lateral margin shows a minute prominence. Posterior margin strongly convex with 2 movable spines at either

side near the terminal spine of the lateral margin; of these spines the inner is twice as long as the outer. Two small teeth or spines on either side of the upper surface; the posterior pair immediately in front of the 2nd teeth of the lateral margins, the anterior pair, more approximate, just in front of the level of the posterior. Outer uropod resembling the figure of the type, anterior or outer margin with a tooth at the distal extremity and with another a little behind it, while the rest of the margin appears uneven; transverse suture with 7 sharp teeth, of which the three inner or posterior ones are larger than the rest; a strong movable spine implanted at the antero-external angle of the uropod. The inner uropod shows another form than in the figure of the type, for it widens distinctly from the base to the rounded apical border; the outer or anterior margin runs nearly straight and ends in a tooth that reaches as far as the apical margin and that is preceded on the distal half by two smaller teeth, of which the anterior is situated just midway between the posterior and the distal tooth; 4 spines on the carina. The upper surface of the telson is closely covered with very numerous, minute, dark points, that occur also on the outer half of the uropods and the abdominal somites, at least the pleura, are likewise covered with these points, that perhaps are to be considered as microscopical granules. Telson and uropods are fringed with very long feathered setae and with longer simple hairs.

The eyepeduncles do not yet reach to the distal extremity of 1st antennular article, corneae distinctly facetted, with the inner part black. Third antennular article about one and a half as long as 2nd; outer upper flagellum 4 mm. long, $^1/_3$ the length of the body, composed of 26 joints that are all longer than thick; inner flagellum thinner and longer, unfortunately incomplete, at least, however, 0,36 mm. longer and composed at least of 29 joints. The antennal peduncle projects by the terminal joint beyond that of the inner antennae; 2nd joint with a sharp spine at the distal end of the lower border, that reaches to the second 3rd part of the penultimate joint, stylocerite little longer than that spine, scaphocerite reaching to the middle of 3rd antennular article and almost to the distal extremity of the 4th joint of the antennal peduncle; flagella lost.

Lower margin of basis of outer maxillipeds (Fig. 15*b*) with a sharp spine that is almost as long as this joint is broad; inner border of the ischium, which is 3-times as long as broad, in the middle with a spine that is a little shorter than the joint is broad, behind it another somewhat smaller one; merus as long as ischium, middle third part of inner margin with two spines that are longer and slenderer than those of the ischium and of which the anterior is a little longer than the posterior. The three following joints gradually diminish in length, carpus with a sharp spine at the distal extremity of the inner margin. Inner crest of ischium with 17 or 18 acute teeth, of which the foremost is much the largest and curved inward, the following 8 or 9 smaller, subequal, the rest gradually decreasing in size. The exopod outreaches the merus by the 3 or 4 terminal segments of the flagellum, peduncle as long as ischium.

Merus of 2nd legs 2 mm. long, slender, almost 6-times as long as broad in the middle, narrowing more backward than forward; lower margin with 4 teeth, of which the largest one is placed just in front of the middle, the 2nd a little behind it, the 3rd midway between this tooth and the proximal end of the joint, the 4th at the distal extremity of the margin. Carpus 1,2 mm. long, 4-times as long as broad. Chela 1,34 mm. long (palm 0,7 mm., fingers 0,64 mm.), $^1/_{10}$ longer than the carpus and 4-times as long as broad near the articulation of the fingers.

Legs of 3rd and 4th pair as slender as those of the 2nd, lower margin of the merus of 3rd pair with 3, of 4th with 2 teeth besides the tooth at the distal extremity. Legs of 5th pair much slenderer, merus 12-times as long as thick in the middle, propodus as long as merus, but slightly broader, widening distally, with a spine at the distal extremity of lower margin; dactylus almost half as long as propodus.

Pleopods of 1st abdominal somite not observed. Of those of the 2nd somite the two branches are slender, of equal length; stylamblys 0,34 mm. long, as long as its distance from the protopod, with a few cincinnuli at the tip.

Geographical distribution: Pailolo Channel, Hawaiian Islands, in 138—140 fathoms (RATHBUN).

5. *Axiopsis (Axiopsis) Picteti* (Zehntner). Pl. VII, Fig. 16—16*b*.

Paraxius Picteti L. Zehntner, Crustacés de l'Archipel Malais, Genève 1894, p. 196, Pl. IX. fig. 25—25*e*, in: Revue Suisse de Zoologie et Annales du Musée d'Histoire Naturelle de Genève, T. II.

Stat. 209. Sept. 23. Anchorage off the South point of Kabaëna-island. Reef. 2 males.

The single type specimen, a female without eggs, of *Paraxius Picteti* Zehntner from the Museum at Geneva is lying before me, being kindly sent by Professor BEDOT. As was already suggested by BORRADAILE in his paper on the Classification of the Thalassinidea (1903), this nice species should not be referred to the genus *Paraxius* Bate, but to the genus *Axiopsis* Borr. The outer uropod, indeed, is provided with a suture, stylocerite and scaphocerite are well developed, the eyes are distinctly pigmented, the gastric region flattened and it has a shallow-water habitat.

The larger male of Kabaëna-island is 22,5 mm. long, from tip of rostrum to end of telson, the carapace is 8,5 mm. long, the abdomen 14 mm. The rostrum (Fig. 16, 16*a*) reaches barely beyond the distal extremity of 1st antennular article and is still slightly shorter than the eyepeduncles, whereas in the somewhat larger type it reaches just beyond them. Immediately behind the acute tip that is obliquely directed downward, the rostrum carries at either side a small spine; these two spines are directed forward and reach almost to the tip, when the rostrum is looked at from above. A second sharp spine, twice as large, occurs at the base of either lateral border of the rostrum; in ZEHNTNER's type both pairs of rostral spines are placed a little farther backward. The anterior border of the carapace forms an obtuse lobe just opposite the lateral side of the eyepeduncle and between this lobe and the rostrum one observes a spine that has the same size as those of the posterior rostral pair; this spine is placed on the anterior border itself, whereas in the Amboina type it is a little remote from it, which is distinctly recognizable in fig. 25*a* of the original paper.

ZEHNTNER writes: „une épine plus grande est placée sur deux carénules obliques et un peu en arrière de la base du rostre" and this spine is indeed visible in fig. 25*a* .... but it is wanting in Fig. 25, where this species has been represented in a lateral view. My supposition of this observation being inexact, was at once proved by the examination of the type, for this pretended spine does actually exist not at all: the "spine" and the two lateral

"carinae" visible in fig. 25*a* are only the contours of the gastric region anteriorly. The anterior extremity of this region is indeed triangular, narrow, pointed, reaches as far forward, in the type, as the posterior pair of rostral spines and is distinctly carinate above; the "carénules obliques", finally, are the oblique furrows that define the gastric region anteriorly on each side. In ZEHNTNER's type the gastric region bears, immediately behind the described median carina of its anterior extremity, in the middle line of the carapace, a spine about of the same size as those of the anterior rostral pair; behind this spine is placed another, which is a little smaller and this second spine is followed backward by three pairs of teeth that gradually decrease in size and become less prominent; the two of the last pair are a little more distant from one another than the preceding, though in fig. 25*a* the distance between them is a little too great. The two last pairs look also too sharp in that figure, they are, indeed, more squamiform and obtuse. The small tooth, visible in this figure in the middle line of the carapace near the cervical groove, does likewise not exist. The lateral borders of the gastric region carry in the type two spiniform teeth (fig. 25*a*), the anterior of which is larger than the other. Between these teeth of the outer row and the median row the type carries at either side another row of 4 teeth; the foremost of these teeth is just as large as the anterior tooth of the median row, but the 3 following are much smaller, i. e. much less prominent, more squamiform, especially the 4th or posterior, which appears to be rounded when seen from above, whereas the 3rd is also obtuse. This 4th pair is situated immediately behind the niveau of the 3rd or posterior pair of the median series, whereas, in fig. 25*a*, it wrongly is drawn just in front of the latter. In ZEHNTNER's type the gastric region bears therefore 20 teeth.

In the male, long 22,5 mm., from Kabaëna-island the squamiform, barely prominent teeth of the posterior pair of the median series are coalesced, at either side of the middle line, with the squamiform 4th teeth of the submedian rows, forming thus at either side a much broader, transverse, squamiform prominence (Fig. 16); the outer row of the gastric region is not formed by two, but by three teeth, the 3rd being situated at the level of the described broader, transverse prominences. In this specimen the gastric region carries thus likewise 20 teeth. A few short setae are implanted between the teeth. Cervical groove rather shallow.

The abdomen, a little more than one and a half as long as the carapace, agrees with the description. The 2nd—5th terga are subequal, the 6th is somewhat longer. The anterior margin of the obtusely pointed pleura of the 1st somite is concave and its posterior margin is overlapped by the rounded anterior margin of the 2nd pleura. The straight, lower border of the 3rd—5th pleura makes a right angle with their posterior margin and all the pleura are unarmed. The abdomen is smooth and shining; the 2nd—5th terga carry a pair of large puncta near their anterior and another pair near their posterior border, the latter situated at a somewhat larger distance from one another and a few similar larger puncta occur also on the pleura. In each of these puncta a fine hair is implanted.

The caudal fan (Fig. 16*b*) resembles that of the type, the following ought, however, to be remarked. The telson is a little shorter in proportion to its breadth and the teeth of the lateral margins and that of the posterior are less sharp. The inner uropod agrees with the type; the concave anterior margin is armed with two teeth besides a couple of smaller teeth at the distal extremity; between the latter and the midrib the apical border is armed

with 4, in the type with 5 spines. The anterior border of the outer uropod bears 6 sharp teeth, in the type 8; one observes in the type 8 teeth along the suture, one at the distal end of the outer rib and two behind and near it, then one at the distal end of the inner rib and 4 small teeth behind it. In the male from Kabaëna-island one observes on the left outer uropod only one tooth behind that at the distal end of the outer rib and only 3 behind the tooth at the distal end of the inner, but on the right outer uropod there are also 2 teeth behind the distal end of the outer rib, and there are only 2 teeth behind that of the inner. The movable spine near the distal end of the anterior border and the immobile spine at the base of this uropod near the basal joint are well developed both in the type and in the "Siboga" specimen; the rounded posterior margin of the movable apical part of this uropod, finally, carries in the type 6, in the male from Kabaëna-island 4 or 5 teeth. These slight differences are certainly owing to the difference of age.

The stout eyepeduncles reach as far forward as the antepenultimate joint of the antennal peduncle; the deep-black coloured cornea does occupy half the length of the peduncles.

The internal antennae are 8,5 mm. long, just as long as the carapace; of their peduncle that is 2 mm. long, reaching almost to the middle of the 4th joint of the antennal peduncle, the 2nd and the 3rd articles are small and of equal size. The thicker flagellum, composed of 42 joints, is a little shorter than the other that has 36 joints.

The external antennae are probably 17 mm. long, twice as long as the inner (the only flagellum that is present being not quite complete), so that they should be in that case a little shorter than the body. The lower margin of the 1st joint of the peduncle which is 3 mm. long, carries a small acute tooth at its distal end. The strongly compressed, sharp, upper margin of the 2nd joint terminates in an acute spine that extends as far forward as the proximal 4th part of the penultimate joint; the lower border of the 3rd joint, coalesced as usual with the 2nd, ends also in a sharp spine that is almost just as long. The scaphocerite, a sharp, somewhat curved spine, which is rather short, reaches until the 2nd third part of the penultimate joint. ZEHNTNER's words: "le 1er article est plus long que les deux suivants, pris ensemble" are inexact, his first joint, which is the 2nd and the 3rd taken together, is barely longer than the 4th or penultimate, but distinctly shorter than the 4th and 5th combined. Fifth joint little shorter than fourth.

The external maxillipeds are pediform, narrow and extend as far forward as the antennal peduncle; the lower border of the merus that has about the same length as the ischium, is armed with 3 strong spines, a short sharp tooth occurs also at the distal end of the lower border of the carpus. Propodus slightly longer than the dactylus.

The thoracic legs are correctly described by ZEHNTNER. Like in the type, the left leg of the 1st pair is the larger; it agrees with that of the type, except that the tubercles on the outer surface of the palm are less numerous, owing, of course, to the younger age of this specimen. Measured horizontally, the chela proves to be 6,75 mm. long, the palm 4,5 mm., the fingers 2,25 mm., just half as long as the palm; the palm is 4,3 mm. high near the articulation of the dactylus and in the type these numbers are nearly the same. The upper border is ridged, the ridge smooth and entire; rounded elongate tubercles occur near the upper border from the articulation of the dactylus nearly to that of the carpus, on the middle of the outer surface

they only occur on the two distal fifth parts and the lower rounded border is quite smooth, so that the smooth proximal part of the outer surface is distinctly larger than the tuberculated area. On the inner side the tubercles are smaller and still less numerous. In the type, on the contrary, the proximal smooth part of the outer side of the palm is only half as large as the tuberculated area.

The smaller chela agrees also with that of the type, it is 5 mm. long, the palm 3 mm. long, 2,1 mm. broad, a little longer than the fingers; the greater lower half of the palm is smooth, whereas in the type the tubercles reach till near the lower border.

The other legs agree with the original description.

The sternal plaque, between the two posterior pairs of legs, is quadrangular, broader inferiorly than at its base, unarmed and consisting of two convex, rounded halves, that are separated from one another by a median furrow. The 1st abdominal somite of this male is devoid of appendages. The abdominal appendages of the 2nd-5th somites are biramous, foliaceous, the rami rather narrow, lanceolate; those of the 2nd pair carry an appendix masculina and a stylamblys, the following pleopods a stylamblys alone. The exopod of the 2nd pleopods is 1,55 mm. long, almost as long as the protopod, lanceolate, presenting its greatest width of 0,43 mm. about at $^1/_3$ its length from the base, being somewhat more than 3-times as long as broad. The endopod is 1,67 mm. long, slightly longer than the other; it presents its greatest width of 0,44 mm. just there, as usual, where the appendix masculina and the stylamblys are inserted, at a distance of 0,76 mm. from the base, i. e. somewhat nearer to the base than to the tip. The appendix masculina is 0,63 mm. long and 0,125 mm. thick, cylindrical, obtuse and supplied with long setae; the stylamblys is shorter, 0,44 mm. long, 0,07 mm. thick, glabrous, but provided on its distal fourth part with cincinnuli. The exopod of the 3rd pleopods is 1,66 mm. long; its greatest width of 0,52 mm. is found at a distance of 0,5 mm. from the base. The endopod is a little longer, viz. 1,8 mm. and at a distance of 0,48 mm. from the base it is 0,48 mm. broad; the stylamblys is implanted just behind the middle, at a distance of 0,72 mm. from the base; it is 0,55 mm. long, 5-times as long as thick and covered on the outer side of its distal 5th part with cincinnuli.

The other male is quite young, measuring 13 mm. from tip of rostrum to end of telson. The telson presents in this specimen exactly the same form as in the type, the lateral teeth and the tooth on the posterior margin are acute; the carapace is 5 mm. long. Flagella of the outer antennae 10,5 mm. long, just twice as long as the carapace. The right cheliped is the larger. The outer side of the palm is rugose near the upper border and a few elongate tubercles occur near the bases of the fingers; the palm of the smaller cheliped bears only a few tubercles near the upper border and is for the rest smooth.

Carapace and abdomen are of a beautiful violet colour, generally pale, but darker on the rostrum, on the gastric region and on the caudal fan; the pleura are whitish in the middle, like also the tips of the caudal swimmerets and the teeth with which they are armed. The anterior legs are also violet, the palm much darker than the other joints, the fingers of the larger cheliped redbrown with white tips and white teeth; of the immobile finger of the smaller cheliped the proximal half is white, both on the inner and on the outer side, the tips of both fingers are redbrown with white extremities. The other legs are more yellowish with

a violet tinge, except the 5th and the lower surface of the abdomen is also yellowish. In the other, very young typical male merus, carpus and palm of both chelipeds are yellow, except the upper border that is violet and the immobile finger is everywhere white.

Geographical distribution: Amboina (ZEHNTNER).

6. *Axiopsis (Axiopsis) Picteti* (Zehntner) var. *spinimana* de Man. Pl. VII, Fig 17, 17*a*.

Axiopsis Picteti (Zehntner) var. *spinimana* J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereeniging (2) Dl. IX, Afl. 3 and 4, 1905, p. 597.

Stat. 209. Sept. 23. Anchorage off the south point of Kabaëna-island. Reef. 1 egg-laden female and 1 younger male.

Together with the two typical males of *Ax. Picteti* (Zehntner) an egg-laden female and a younger male were collected, about which it is difficult to decide whether they are to be considered as a distinct species or as a variety: they closely resemble the typical form indeed, except in the characters of the 1st pair of legs and a few other slight differences. They are provisionally described as a variety, for which the name of *spinimana* was proposed.

The egg-bearing female is 25 mm. long, the carapace measuring 9,25 mm., the abdomen 15,75 mm. The yellow, rather numerous eggs are globular, their diameter measuring 0,6 mm. The rostrum reaches as far forward as the eyes, until the middle of 2nd antennular article. The rostral teeth and those of the carapace agree with those of the male, long 22,5 mm., described above, but the posterior pair of teeth of the median series are not coalesced with the posterior teeth of the submedian rows to form a transverse crest at either side of the middle line, but they are separate, exactly as in ZEHNTNER's type; the external row does consist, however, at either side of 3 teeth, like in the male, so that the teeth on the gastric region are 22 in number.

The telson has a somewhat other form. In ZEHNTNER's type the telson is 3,2 mm. long, the median spine of the straight posterior margin included, and 3,5 mm. broad anteriorly; in the egg-bearing female it is 2,6 mm. long and 3,3 mm. broad. The telson appears thus much broader than in the type, in which it is nearly quadrate and it differs also by the posterior margin which is distinctly concave. In the other, younger male of this variety, long 18,5 mm., the telson appears equally broadened, but the posterior margin is straight.

In the egg-bearing female the anterior border of the inner uropod is straight, but in the male, long 18,5 mm., it is concave, like in the type and like in the other specimens. The outer uropod agrees with the type, except that, as in the male long 22,5 mm., the anterior border bears only 6 spines, instead of 8.

The two pairs of antennae, the eyepeduncles and the external maxillipeds do not appear to differ from those of the typical specimens. The variety *spinimana* is at once characterized by the 1st pair of thoracic legs. In the egg-bearing female the right cheliped (Fig. 17) is the larger. The upper border of the merus terminates at the distal end in a small, obtuse tooth, not found in the type; the ridge on the upper border of the carpus ends also in an obtuse tooth, that is wanting in the typical species. The larger chela is 7 mm. long, the palm 4,5 mm. long and 4 mm. broad, without the spines of the upper border. The upper border

namely is armed with a row of 6 strong, acute spines, that grow gradually longer from the proximal to the distal end and that are curved forward. Nearly the whole outer side of the palm is covered with tubercles that show another form than in the type. Those that occur immediately below the spines of the upper border, are somewhat curved forward, subacute, except the first two or three, and a little smaller than those spines; the rest are conical, with obtuse tip and gradually decrease in size inferiorly and on the base of the immobile finger; the tubercles are almost wanting near the base of the dactylus and the palm is quite smooth and shining proximally, near the lower border which is also smooth and rounded. In ZEHNTNER's type the tubercles are generally more or less elongate, not conical. The inner side of the palm is covered in the type with tubercles just below the upper border and on a narrow area, that extends, not far from the distal margin, until the lower; these tubercles are somewhat conical and subacute above, the rest are lower and rounded, and the greater proximal half of the inner surface is smooth. In the egg-bearing female, however, the inner surface is everywhere smooth, except a longitudinal row of sharp spines immediately below those of the upper border; these spines are also a little smaller and less strongly curved. A few very small tubercles exist moreover between both rows. In the type the upper surface of the dactylus is divided by two furrows into three rounded ridges, that are nearly equally broad; in the egg-bearing female, however, the median ridge is rounded and much broader than the inner and the outer, that are rather sharp, especially the inner. For the rest the fingers resemble those of the type. The outer and the upper side of the fingers and the tuberculated and spiniferous part of the palm are grown over with stiff yellow hairs, that are longest on the fingers and on the upper border of the palm; these stiff hairs are wanting in the typical species.

The smaller chela (Fig. 17*a*) is also grown over with more numerous, stiff hairs than in the type; it has the same form but the upper border of the palm bears a row of four acute spines and, instead of the elongate tubercles on its outer surface, one observes here only 10 or 11 obtuse, conical tubercles, situated on the proximal third part of it, but not extending to the carinate, lower border.

The other legs do not differ from the type.

The colouration is also somewhat different. The lateral borders of the rostrum and the teeth on the gastric region are of a darker violet, the rest of the gastric region is yellowish, whereas, posterior to the cervical groove, the carapace shows a pale violet tinge. The abdomen is also more yellowish, the 6th tergum, the anterior half of the telson and a part of the pleura are of a pale violet. The antennae and the external maxillipeds are darkviolet, the flagella of the outer antennae with white rings like in the type. The upper and the lower margin of ischium and merus are violet, the remaining parts yellow, the carpus yellow except the upper border that is violet; the tubercle at the distal end of merus and carpus white. The tuberculated and spiniferous part of the chelae is of a dark violet, the rest yellowish, the spines on the upper margin white; on the smooth inner surface the greater distal half is deep violet. The lateral sharp ridges on the dactylus are white, the broader median ridge redbrown. The smaller chela is violet, except a small proximal part near the lower border, that is yellowish and the fingertips that are white.

7. *Axiopsis (Axiopsis) spinosissima* (Rathb.). Pl. VIII, Fig. 18—18*g*.

Axius spinosissimus M. J. Rathbun, The Brachyura and Macrura of the Hawaiian Islands, Wash. 1906, p. 894, fig. 50*a*, 50*b*.

Stat. 204. Sept. 20. Lat. 4° 20′ S., long. 122° 58′ E. Between islands of Wowoni and Buton; northern entrance of Buton-strait. From 75—94 m. Bottom sand with dead shells. 1 female.

Like the only specimen from Molokai Island, on which this species was founded by Miss RATHBUN, also the "Siboga" specimen is rather much damaged, the legs of the 1st or anterior and of the 3rd pair wanting completely. While the Hawaiian specimen was 18,5 mm. long, that of the "Siboga" measures 16,82 mm. from tip of rostrum to end of telson, measured in the median line, the carapace 6,92 mm., the abdomen 9,9 mm. Carapace distinctly arched longitudinally, sloping obliquely downward from the middle of the gastric region to the tip of the rostrum and a little less backward. Rostrum (Fig. 18) elongate-triangular, 1,6 mm. long, almost $^1/_4$ the length of the carapace, the rostrum included; tip acuminate, not turned upward, the lateral border on the left side with 4, on the right with 5 spines, the distance between the anterior pair and the tip a little larger than the subequal distances between the spines themselves.

Distance between the tip of rostrum and the cervical groove, measured in the middle line, 4,7 mm., about 3-times the length of the rostrum; spines along the posterior border of the cervical groove well developed. The median carina of the gastric region carries in the middle, instead of a spine, a small oval tubercle, 0,12 mm. long and a little less broad; in front of this tubercle the carina is armed with 6, posterior to it with 5 spines, that are a little smaller than the anterior ones, while the foremost spine is placed just in front of the orbital margin, i. e. the base of the rostrum. At either side of the median row runs an outer or lateral and a submedian carina, each armed with 9 spines placed at equal distances; the spines of the outer carina are a little larger than those of the inner and in both carinae the posterior spine but one is a little smaller than the others; the spines of the submedian carinae are of the same size as those of the median row and the submedian carinae are as far distant from the latter as from the outer. The outer carinae that are a continuation of the lateral borders of the rostrum, at first diverge until to the middle of the gastric region and then slightly converge to the cervical groove, so that, like in the allied species, the spiniferous area of the gastric region is distinctly broader in the middle than anteriorly or posteriorly.

The anterior border of the carapace is armed at either side with 2 spines, one above the outer border of the eyepeduncle, the other above that of the antennal peduncle, these spines are nearly as large as those of the median gastric carina. The hepatic spine, of the same size as those of the outer gastric carinae, is implanted at the level between the 4th and 5th spine of the latter. The hinder part of the carapace, posterior to the cervical groove, is distinctly carinate along its posterior half; according to Mr. WALDO L. SCHMITT (in litt.) of the U. S. National Museum in the type, that is a little longer than the "Siboga" specimen, this hinder part is rather sharply, at least distinctly carinate for about its posterior two-thirds. When this species, of which at present only two specimens are known, should, however, prove to attain a somewhat larger size, the carina will probably reach in these larger specimens to the cervical groove, like in *Ax. Habereri*. At either side of the middorsal line there are a few

transverse elevations, on which transverse rows of 5 or 6 setae are implanted and smaller ones with only 2 or 3. A little farther distant from the cervical groove than from the posterior border of the carapace is situated the branchial groove that does not seem to indent the median carina.

The somites of the abdomen, that is nearly one and a half as long as the carapace, are somewhat hairy, the setae being of unequal length. Pleura of 1st somite acuminate. Telson (Fig. 18*a*) 2,3 mm. long, the posterior spine included and 1,5 mm. broad anteriorly, one and a half as long as broad, showing its greatest width at $^1/_4$ its length from the base. The lateral margins are armed with 3 spines, the tip of the anterior situated at $^1/_3$ the length of the telson from its base; the two following are movable, smaller than the anterior and of equal size, the 3rd implanted at the posterior extremity of the margin; posterior margin rounded, with a spine, long 0,2 mm., in the middle and with 2 movable spines abreast on either side, implanted just posterior to the 3rd lateral spine and much larger than it, the inner as long as the median terminal spine, the outer a little smaller. Two pairs of spines on the middle of the telson, the anterior pair at the niveau of the anterior marginal spines, the posterior, twice as far distant from one another, nearly midway between the 1st and 2nd marginal spines. A tuft of long setae at either side of the posterior margin of 6th somite and a tuft of shorter ones in the middle. Three transverse rows of long setae just in front of the anterior pair of spines, a transverse row of long setae on either side of the terminal spine close by the posterior margin and sparse setae on the surface. Uropods about as long as the telson. Transverse suture of outer uropod with 8 or 9 spines, outer edge with 7 or 8 small spines that gradually grow longer distally, outer rib with a row of 4 spines; outer margin of inner uropod terminating distally in a long spine, preceded by 2 smaller ones close by the margin, midrib with a row of 5 spines, of which the distal one is situated near the rounded apical border. Edges of uropods and telson fringed with long feathered setae, between which much shorter, stiff setae are implanted, there are also some plain hairs that are still longer than the feathered setae. Not far from the base the inner uropod presents a short curved crest or ridge (Fig. 18*a*), the convex side of which is turned toward the apical border.

Eyepeduncles little, about $^1/_8$ shorter than the rostrum, elongate, rounded at the tip; cornea faceted, slightly broader and only $^1/_4$ shorter than the rest of the stalk, internally black, the black part 0,48 mm. long, $^1/_3$ the length of the peduncle, not reaching to the outer side. Facets distinct, hexagonal, peduncle a little hairy. Internal antennae, measured from the anterior border of the carapace to the extremity of the lower or thinner flagellum, 7,3 mm. long, a little longer than the carapace, almost half as long as the body; the peduncle reaches beyond the eyestalks by the 3rd joint, that is 0,28 mm. long and 0,24 mm. broad distally. The lower, thinner flagellum, 5,5 mm. long, is composed of 42 or 43 joints, that are all longer than thick, except some basal articles; anteriorly they become gradually more slender; the upper flagellum, 0,5 mm. shorter, shows the same thickness as the lower and consists of 34 joints that are also longer than thick and much resemble those of the lower.

The peduncle of the outer antennae projects by its terminal joint beyond the rostrum. The stylocerite extends to the middle of the 4th joint and of the cornea of the eyestalks; the similarly acuminate scaphocerite reaches to the distal extremity of the 4th joint and, projecting beyond the eyes, appears about as long as the rostrum, the sinuous inner margin bears at its

proximal extremity a small acute tooth; the infero-internal margin of the 2nd joint ends distally in a long spine, that almost reaches to the distal third of the penultimate joint and that is preceded by a smaller spine, only half as long; terminal joint half as long as penultimate. Flagella incomplete.

Ischium of outer maxillipeds (Fig. 18*b*), measured along their outer margin and the spines excluded, 3,6-times as long (1,3 mm.) as broad (0,36 mm.) in the middle, growing slightly broader distally, inner border with three spines of equal size and at equal distances from one another; merus 1,2 mm. long, nearly as long as the ischium, 3-times as long as broad in the middle, slightly narrowing distally, its inner margin armed with five acute spines of which the anterior, projecting beyond the carpal articulation, is as long as the merus is broad, while the four following rapidly decrease in length and size; carpus 0,86 mm. long, two-thirds the merus, and 0,35 mm. thick, its inner margin terminating in a small spine that barely reaches beyond the articulation with the propodus; propodus 0,8 mm. long, nearly as long as the carpus and 3-times as long as broad; dactylus 0,48 mm. long, $^3/_5$ of the propodus, 0,19 mm. broad, not yet 3-times as long as broad. Internal crest of ischium armed with 17 spines that gradually increase in size from the 1st or proximal to the distal one. Exopod without the terminal setae 1,7 mm. long, not yet reaching to the distal extremity of the merus, peduncle as long as flagellum.

Ischium of 2nd legs with a spine on the lower margin, preceded by a smaller one. Measured along the upper border the merus proves to be 2,7 mm. long, 0,42 mm. broad in the middle, 6,4-times as long as broad, lower margin fringed with long setae and armed with 4 spines that gradually increase in size from the proximal to the distal one (Fig. 18*c*), like also the distances between them; carpus 1,4 mm. long, half as long as the merus, presenting its greatest width of 0,42 mm. a little beyond the middle, with a spine near the distal end of the lower border, about of the same size as the anterior spine of the merus. Chela, measured to the distal extremity of the immobile finger, 1,75 mm. long, the palm being 0,86 mm. long, the immobile finger 0,89 mm., dactylus 0,98 mm. long, slightly longer than the other finger; the palm being near the articulation of the fingers 0,47 mm. broad, the chela appears about 4-times as long as broad; the fingers, which are slightly longer than the palm, bear on their prehensile edges small spines or teeth, that on the dactylus occupy the distal half, while on the other finger they reach a little farther to the articulation. Carpus and chela like the preceding joint very setose.

Ischium of 4th legs with one or two small teeth on the lower border. Merus slender, 2,64 mm. long, 0,28 mm. broad in the middle, 9,4-times as long as broad, with 4 rather small spines on the lower border, at equal distances from one another and increasing in size from the 1st or proximal one to the 4th; carpus 1,35 mm. long, half as long as the merus, 0,26 mm. broad, 5-times as long as broad; propodus (Fig. 18*d*) 2,05 mm. long, one and a half as long as the carpus, 0,18 mm. broad in the middle, 11-times as long as broad, somewhat widened at the distal extremity, with 7 movable spines on the lower margin, near each of which one long and a few shorter setae are implanted and with a tuft of setae at the distal end, among which a long spiniform pectinated seta, that is 0,42 mm. long, $^1/_5$ the length of the propodus; dactylus (Fig. 18*e*) 1,08 mm. long, half as long as the propodus, slender, about 9-times as long as broad at its base, slightly curved, tapering and with a spine at $^1/_4$ its length from the tip.

Merus of 5th leg 2,12 mm. long, 0,23 mm. broad in the middle, 9-times as long as broad, carpus 1 mm. long, half as long as the merus, 4,5-times as long as thick distally; propodus (Fig. 18*f*) 2,25 mm. long, nearly as long as the merus, but 16-times as long as broad, being 0,14 mm. broad in the middle, with 5 or 6 spines on the distal half of the lower border, somewhat thickened at the distal extremity and presenting here a tuft of setae, some of which are pectinated; dactylus (Fig. 18*g*) 0,95 mm. long, almost half as long as the propodus, straight, about 7-times as long as broad near the base, tapering and armed with 4 movable spines.

The pleopods of the 2nd–5th abdominal somites are all furnished with a stylamblys only, the 2nd bearing no appendix masculina; the specimen is therefore apparently a female; of the two slender filaments on the 1st somite, which in other species represent the pleopods, no one was observed — perhaps they are broken off.

Paraxiopsis de Man.

Paraxiopsis n. subg., J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereeniging. (2) Dl. IX, Afl. 3 en 4, p. 597.

A subgenus of the genus *Axiopsis* Borr., characterized by the carapace sloping anteriorly down, so that the rostrum is situated below the level of the gastric region, being not continuous with it and in which the antennal thorns (stylocerite and scaphocerite) are very small.

Paraxiopsis differs from *Calocaris* Bell by the carapace presenting no keel in the hinder part, by the well-faceted and pigmented eyes and by a shallow-water habitat.

Type: *Axiopsis (Paraxiopsis) Brocki* (de Man).

1. *Axiopsis (Paraxiopsis) Brocki* (de Man). Pl. VIII, Fig. 19—19*j*.

Axius Brocki J. G. de Man, in: Archiv f. Naturgeschichte. Jahrg. 53, 1888, Berlin, p. 475, Taf. XX, fig. 3.

Axiopsis (Paraxiopsis) Brocki J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereeniging, (2) Deel IX, 1905, Afl. 3 en 4, p. 597.

Stat. 51. April 19. Madura-bay and other localities in the southern part of Molo-strait. From 69 to 91 m. Fine grey sand; coarse sand with shells and stones. 1 young male.

Stat. 79b. June 12/13. Pulu Kabala-dua, Borneo-bank. Reef. 1 adult egg-laden female.

Stat. 131. July 24/25. Anchorage off Beo, Karakelang-islands. Reef. 1 full-grown, egg-laden female, bearing in the carapace a female of a parasitic Isopod, *Pseudione Hanseni* Nierstrasz & Brender à Brandis.

Stat. 154. Aug. 14. Lat. 0°7′.2 N., long. 130°25′.5 E. 59—83 m. Bottom: grey muddy sand, shells and Lithothamnion. 1 young female.

As regards the following descriptions it may be remarked that the detailed descriptions of the specimens, collected at the Stations 79b and 154, were written by the author in 1905, that the specimen from Stat. 51 was unfortunately overlooked by him at that time and that the full-grown female from Stat. 131 was first received in 1923, because it was originally sent to Professor Nierstrasz for the examination of the parasitic Isopod in the carapace: these two specimens are therefore described more succinctly.

The two egg-bearing females from Amboina and the male from Pulu Edam, on which

this species was founded in 1888, were in 1905 lying before me. The young male from Stat. 51, that has lost both chelipeds of 1st pair, is 17 mm. long. The rostrum that agrees exactly with fig. 3*a* of the original description as regards its form and shape, extends about to the distal extremity of 2nd antennular article and is one and a half as long as broad at its base, i. e. at the level of the orbital margin. In the original description the lateral borders of the rostrum are described as being not dentate and the three lateral teeth at either side as being placed on the gastric region; this is not quite exact, because the teeth of the anterior pair are placed just in front of the level of the orbital margin, on the rostrum itself, while the teeth of the 2nd pair are placed at that level. In the male from Stat. 51 the teeth of the anterior pair are the smallest, those of the 2nd the largest, one and a half as large, and the teeth of the 3rd pair are barely larger than those of the anterior; the teeth of the 3rd pair are a little farther distant from the 2nd than the 2nd from the 1st. The lateral borders of the rostrum, however, carry each 6 or 7 much smaller teeth, that diminish in size anteriorly, becoming gradually less distinct towards the tip; one of these teeth was already described in 1888 and is visible in fig. 3*a*. The caudal fan agrees, as regards the number of teeth and spines, with that of the female from Stat. 154 (Fig. 19*f*), but the median tooth on the posterior margin of the telson is a little longer, 0,12 mm. long and 0,04 mm. broad at its base.

The pleopods of the 1st somite are rudimentary, but perhaps broken off. Those of the four following pairs are devoid of a stylamblys, but the pleopods of the 2nd pair carry an appendix masculina (Fig. 19*i* and 19*j*), that measures almost $^1/_4$ the length (1,44 mm.) of the endopod, viz. 0,32 mm.; its distance from the base of the endopod measures about one and a half its length and the slightly thickened extremity is provided with about 10 long setae, of which the median ones are a little longer than the appendix itself.

The egg-laden female from the Borneo-bank is 20,5 mm. long, the carapace, rostrum included, 7,75 mm., the abdomen 12,75 mm. The carapace, which shows its greatest width just in the middle and which is not much compressed, is distinctly arched above from before backwards and slopes anteriorly down to the rostrum which therefore is situated on a much lower level than the back of the carapace. The spiniform rostrum (Fig. 19) reaches a little beyond 1st antennular article, its sharp tip is feebly turned upward; its form (Fig. 19*a*) is somewhat different from that of the larger typical female from Amboina, figured l. c. fig. 3 and 3*a*. In this female from Amboina the rostrum appears narrow-triangular, with nearly straight lateral margins and it narrows gradually to the tip; in the female from Stat. 79b, however, the rostrum, distinctly concave above, appears broader at its base, it narrows more rapidly until the middle so that the lateral margins are distinctly concave. The lateral margins which are continued on to the gastric region as sharp ridges that first diverge and then curve backward, reaching till near the cervical groove, carry at the base of the rostrum, just behind the distinctly faceted and pigmented eyes, a strong sharp spine and behind it, on the gastric region, another that is a little smaller; the two spines are almost as far distant from one another as the rostrum is long. In front of the anterior spine the lateral margins of the rostrum carry on the right side one, on the left two spinules, that are extremely small, so that they are only perceptible by means of a very strong magnifying-glass. A few setae are implanted between these spines. In the other typical female from Amboina the rostrum and its teeth agree with

the specimen from Stat. 79^{b}, but this fact was not mentioned in my description of 1888. The ridge in the midline of the gastric region is sharp and reaches anteriorly as far as the strong spines at the base of the rostrum; posteriorly it does not extend to the cervical groove and it is also not continued behind the latter. The median ridge, a little higher anteriorly than posteriorly, bears in the middle a small prominence, which in this specimen is rather inconspicuous. The two submedian ridges that extend almost as far backward as the median carina, end anteriorly in a small tooth, immediately behind the level of the posterior pair of spines of the lateral ridges and these spines are a little larger than the teeth at the end of the submedian ridges; the latter are interrupted in the middle and carry on the left side one, on the right two minute teeth behind one another.

The cervical groove is conspicuous, its distance, in the midline, from the posterior border of the carapace is nearly $^{1}/_{3}$ the length of the latter. The anterior border of the carapace carries a small sharp tooth just above the insertion of the antennal peduncle and a still smaller tooth just below it; in my first description both have been overlooked.

The abdomen is a little more than one and a half as long as the carapace. The pleura of the 1st somite are obtuse inferiorly; in the larger typical female from Amboina their lower extremity is pointed, sharp and directed backward, but in the two other types it ends also obtuse. The 2nd—5th terga are subequal, their flattened pleura are rounded posteriorly and their lower border is unarmed; the pleura of the 6th somite, which is broader than long, are obtuse. The pleura are somewhat punctate, very finely, for the rest abdomen and carapace are smooth. Of the three pairs of spinules on the upper surface of the telson the anterior is situated in the middle, but the posterior is wanting. Near the postero-lateral angles the telson carries, however, an oblique row of 3 spinules, the posterior of which, at the angles, is movable and somewhat larger than the two others that are of equal size and immobile; the two last named spinules are wanting in the larger type from Amboina, whereas the other type agrees, as regards the armature of the telson, with the specimen from Stat. 79*b*. The lateral edges of the telson are armed each with 4 teeth and a small, sharp tooth occurs in the middle of the posterior border, fixed on the lower surface.

The anterior edge of the outer uropod carries 3 small teeth and a larger movable one occurs at the distal end; 13 sharp teeth are placed along the transverse suture and the anterior longitudinal carina carries 4 teeth. The anterior edge of the inner uropod ends in a strong tooth, that is preceded by two smaller ones; the midrib is armed on the right uropod with 6, on the left with 5 sharp teeth.

The longer flagella, a few of the last joints of which are wanting, are probably 8 mm. long; the peduncle is 1,3 mm. long, the internal antennae probably 9,3 mm. The 3rd article of the peduncle that reaches as far forward as the 4th joint of that of the outer antennae, is little shorter than the 2nd, which is about as long as thick.

The outer antennae agree with the original description. They are probably 16 mm. long (a few last joints are evidently wanting) and twice as long as the carapace; the peduncle measures 3 mm. The outer border of the 2nd joint ends in a very small tooth; the small scaphocerite is only 0,36 mm. long and consists of a larger outer and a shorter inner spine: the larger extends only for a very short distance beyond the 3rd joint. The inner border of

this joint ends also in a spine, that is preceded by a much smaller one. The penultimate joint is 0,7 mm. long and nearly half as thick, the terminal joint, finally, measures little more than half the penultimate.

The two first joints of the external maxillipeds that reach just beyond the antennal peduncle, are armed each with a spine at the far end of their lower inner border. Ischium as long as the merus. Merus twice as long as broad, being 0,56 mm. broad in the middle and 1,2 mm. long, measured along its outer border; the inner border is armed with 6 spines, of which the 1st, not far from the proximal extremity, is very small, whereas the following gradually increase in length, so that the foremost spine, 0,5 mm. long, appears as long as this joint is broad. The carpus, 1 mm. long, bears a short spine at the distal end of its inner border; the propodus, as long as the carpus, narrows somewhat distally, the dactylus is 0,7 mm. long, somewhat shorter than the propodus. As usual these footjaws are fringed with setae on their inner border and the ischium carries a denticulated crest of 13 or 14 strong, sharp teeth on its inner side.

Whereas the anterior legs are somewhat unequal in the larger, typical female from Amboina, the right being the larger, they are subequal and also feebler in the female from the Borneo-bank. The coxae of both legs carry a small spine at the distal end of their lower, inner border and another similar small tooth occurs near it; in both legs the lower border of the ischium is armed with a spine not far from the distal end and with another much smaller not far from the proximal extremity, that has about the same size as the little spine of the coxae. In both legs the lower border of the merus carries 3 spines, that slightly increase in length from the 1st to the 3rd and a single small spine occurs on the upper border, a little beyond the middle, opposite the 3rd spine of the lower. The lower border of ischium and merus does not show the fine serrulation, which one observes in the larger typical female from Amboina, but which in the other type from Amboina and in the male from Pulu Edam is nearly or fully wanting. The chelae are a little longer than the merus. The upper border of the palm, that is about twice as long as broad, is distinctly ridged along its whole length and terminates at the distal end in a very small tooth; the lower border is also ridged nearly to the tip of the immobile finger and very faintly serrated. The outer side of the palm is smooth, but there is a row of puncta near and parallel with the upper border and another near and parallel with the lower; in these puncta short setae are inserted and short hairs occur also on the outer side of the ridge of the lower border. The fingers terminate in slender, curved and pointed tips; the cutting-edge of the immobile finger of the left leg carries 24 small sharp teeth that occur along the whole length of the finger till near the tip and that are of somewhat unequal size; the dactylus has no teeth near the base, so that there are here only 16 teeth that are lower, smaller, less prominent and less sharp. The upper border of the dactylus is distinctly ridged and faintly furrowed on its outer side just below it.

The lower border, fringed with long hairs, of the merus of the 2nd pair of legs carries in both, besides the small tooth at the far end, only two, one in the middle a little larger than the distal tooth, the other, as small as the latter, between it and the proximal end of the margin. In the larger female from Amboina the lower border of the merus carries in the right leg besides the tooth at the distal end, 5 teeth, viz. one in the middle, the others very small

between it and the proximal extremity; in the left leg there are 6 very small teeth between that in the middle and the base. In the other female from Amboina the meri of both legs of the 2nd pair carry but one single, very small tooth just in the middle of the lower border, besides that at the distal end and in the male from Pulu Edam both legs agree with the female from Stat. 79b: we may therefore conclude that the number of teeth is here quite variable. The carpus, 1,7 mm. long, and the chela, 2,1 mm. long, agree with the original description; the fingers, 0,9 mm. long, a little shorter than the palm, bear on their cutting-edges small equal teeth. Carpus and chela are likewise fringed with long hairs.

The meri of the 3rd pair, 3,5 mm. long, are 7-times as long as broad and carry a small tooth at the distal end of the lower border; the carpus measures $^3/_7$ the length of the merus. The propodus, 2,1 mm. long, is almost one and a half as long as the preceding joint; in the larger female from Amboina carpus and propodus are respectively 1,4 mm. and 2,5 mm. long, the propodus, though longer than in the female from Stat. 79b, is not twice as long as the carpus, as one reads in the original description. The lower border of the propodus carries 6 spines and a larger, also movable spine is implanted near the 6th at the distal end; a small, movable spine occurs on the outer side at $^1/_4$ the length from the distal end. The dactylus, 1,06 mm. long, is a little shorter than the carpus and carries 8 spines on its lower margin, besides 2 larger ones near its base on the outer side.

The 4th legs are wanting; the statement in the original description that those of the 5th pair agree with the 3rd is erroneous. The merus, 2,1 mm. long, is 6-times as long as broad; the carpus is 1,2 mm. long and rather thick, its greatest breadth being 0,35 mm. The propodus, 2,3 mm. long, a little longer than the merus, is 0,3 mm. broad at its proximal extremity and, narrowing somewhat, appears 0,24 mm. broad a little nearer to the proximal than to the distal extremity; from this point it becomes gradually wider until the distal end, where it is 0,4 mm. broad. Two or three spines are placed at the lower end of the dilated distal extremity and the dactylus articulates with the upper end, so that this leg appears somewhat subcheliform. The distal half of the lower border and the distal end are thickly beset with spatulate bristles and the outer surface bears near or on the lower border a few movable spines, one transverse set of two in the middle, one also of two a little farther and one of three or four near the distal end; moreover a few long hairs are implanted on it. The somewhat dilated dactylus is 0,96 mm. long, pointed and armed on its outer side with 3 movable spines, a larger, 0,2 mm. long, in the middle and a shorter before and behind it.

Eggs globular, diameter 0,46—0,5 mm. broad.

The abdominal appendages of the 1st somite are slender, uniramous, 1,2—1,3 mm. long; those of the following biramous, the rami narrow, lanceolate, sub-equal in length and breadth, devoid of a stylamblys.

The full-grown, ova-bearing female from Stat. 131 is about 36 mm. long (carapace 14 mm., abdomen 22 mm.), larger than all the previously described specimens. The rostrum (Fig. 19*b*) that reaches to the middle of 2nd antennular article, ends in two spines (Fig. 19*c*), situated above one another, an abnormality of course; it is not yet one and a half as long as broad at its base. At the level of the orbital margin the rostrum is armed at either side with

a tooth of moderate size; at a short distance of it the lateral borders of the rostrum are armed with another tooth a little smaller than the basal tooth and in front of the former, the lateral borders carry a third which is very small. The lateral borders are continued backward as a ridge, first diverging, then curving backward and inward and at a short distance behind the anterior border of the carapace the diverging ridge carries a tooth of the same size as the basal tooth; from this tooth the basal tooth is twice as far distant as from that which is placed immediately in front of it. The lateral and the submedian ridges or carinae are entire, not interrupted and the latter terminate distally in an obtuse, respectively rounded tooth.

The caudal fan agrees with that of the young female from Stat. 154 (Fig. 19*f*), but the 2nd and 3rd lateral tooth of the telson are situated on the left side a little nearer together than on the right; anterior edge of outer uropod with 4 teeth, including the distal one, transverse suture with 12 acute teeth, besides the movable spine near the antero-external extremity and there are 7 teeth, arranged in two parallel rows on the broader, anterior, longitudinal rib. Anterior border of inner uropod with 4 teeth, including the distal one; longitudinal rib with 5 teeth.

Merus of 2nd maxillipeds 4-times as long as wide; the peduncle of the exopod reaches to the distal third of the merus, flagellum reaching by half its length beyond the latter; epipod and podobranch well developed, the former with some setae both on its upper and lower side; still another gill was observed, situated close by, perhaps an arthrobranch.

Inner border of ischium of external maxillipeds terminating in a sharp tooth, a sharp tooth does probably also occur on the coxa; merus almost 3-times as long as broad, with 3 sharp teeth on the inner border of which the middle one, as far distant from the 1st or proximal as from the 3rd, is slightly larger than the two others, the 3rd situated at the anterior third. Merus little longer than ischium, $2^1/_2$-times as long as broad in the middle, lower margin with 8 acute teeth, of which the 8th or distal one is by far the largest and as long as the merus is broad, while the others rapidly decrease in size, so that the 3 or 4 proximal teeth are very small. Carpus with a sharp tooth at the end of the lower border. Stalk of exopod reaching by $^1/_5$ its length beyond the ischium of endopod, flagellum as long as the stalk, composed of 20 joints and extending by the 5 last joints beyond the merus. Crest on the inner side of ischium with 18 spines of unequal size, the 6 or 7 proximal ones very small.

Unfortunately both chelipeds of 1st pair are also wanting in this specimen.

The great variability of *Axiopsis Brocki* is also proved by the young female from the coast of Waigeu Island. This specimen is 23 mm. long, still a little longer than the female from the Borneo-bank; the carapace is 8,4 mm. long. Its colours have not yet fully faded. Rostrum and carapace are of a pale ruddy colour and the abdominal somites are, especially on their lateral parts, beautifully ochraceous, but the lower half of the pleura and the median part of the terga, except the 2nd somite, are whitish.

The rostrum (Fig. 19*d*), reaching to the middle of 2nd antennular article, is triangular, barely longer than broad at its base, a little concave above, the tip slightly upturned; as in the larger typical female from Amboina, there is a tooth at the base of the straight lateral borders and two teeth stand behind it on the diverging continuation of the lateral borders on to the gastric region; of these teeth the anterior, immediately behind the anterior border of the carapace, is a little farther distant from the posterior than from the basal tooth of the

rostrum. Just midway between the basal tooth and the tip of the rostrum the lateral borders carry a very small, acute denticle and another still smaller, obtuse denticle between it and the basal tooth; these minute denticles may easily be overlooked. The basal tooth is a little larger than the 2nd and the 2nd a little larger than the 3rd or posterior tooth on the lateral carinae. Posterior to the 3rd tooth the lateral ridges curve soon backward and slightly inward, reaching a short distance behind the distinctly developed, small tubercle of the middorsal ridge on the middle of the gastric region. This ridge reaches anteriorly until midway between the basal tooth and the 2nd and fades away at some distance from the cervical groove; this distance is a little longer than that between the extremity of the ridge and the small tubercle. The submedian ridges reach by their small and subacute, terminal tooth until just before the 3rd or posterior teeth of the lateral ridges; they are straight and, slightly diverging, extend but little behind the lateral ridges. The hinder part of the gastric region appears slightly granular when examined by a strong lens, the cardiac and branchial regions are distinctly punctate. The two teeth on the anterior border of the carapace are distinct; the upper tooth, placed just above the antennal peduncle, is twice as large as the lower, near the lower border of the peduncle.

The pleura of the 1st abdominal somite (Fig. 19*e*) are longer and more narrowed inferiorly than in the female from the Borneo-bank and their hooked extremity is curved backward; they resemble somewhat those of the larger typical female from Amboina. The posterior border of the 2nd, 3rd and 4th pleura is straight; the angle that it makes with the lower border, is in the 2nd, the 3rd and the 4th slightly obtuse; the posterior border of the 5th is a little convex and the anterior margin of the 6th ends posteriorly in a microscopical, movable spinule. In the female from the Borneo-bank, however, the posterior border of all these pleura is convex and it makes no angle with the lower border, into which it curves regularly, just as in the female from Amboina. The 3rd and 4th pleura carry a small, sharp tooth at their antero-inferior angle; these teeth, that also exist in the typical specimens from Amboina and Pulu Edam, are wanting in the female from Stat. 79b. The 6th pleura are very sharp inferiorly, whereas they are rounded in the female from the Borneo-bank; in the females from Amboina they are obtuse and in the male from Pulu Edam they end in a small, though sharp tooth.

The telson (Fig. 19*f*) agrees with that of the larger female from Amboina. The anterior pair of spinules, is, as in this female, situated distinctly nearer to the anterior than to the posterior border and one observes, behind this pair, on the right side 2, on the left 3 spinules. The lateral margins are armed with 4 teeth, of which the tooth at the postero-lateral angle is a little smaller than the three preceding; close by this posterior tooth a somewhat larger, movable spine is implanted, which in the larger female from Amboina is comparatively a little larger. When these specimens are compared with the female from Stat. 79b, we observe that the arrangement of the spinules on the upper surface is thus somewhat variable. Like in the larger female from Amboina, the median tooth of the posterior margin is continuous with the upper surface, whereas in the female from Stat. 79b it is attached to the lower.

Like in the larger female from Amboina the anterior border of the outer uropod is armed with 5 teeth, besides the larger movable spine near the distal extremity; 13 sharp teeth occur along the transverse suture and the anterior rib carries 5 small teeth. In the larger

female from Amboina the anterior border of the right endopod is armed with 6 teeth, of which that at the distal end is the largest, the anterior border of the left, however, with 3 or 4. In the male from Stat. 154 the anterior border carries, as in the smaller female from Amboina, only 2 teeth, besides that at the distal end; the longitudinal midrib is furnished on the right endopod with 6, on the left with 5 teeth.

The flagella of the internal antennae are incomplete. The external antennae are 19 mm. long, the peduncle (Fig. 19*g*) measuring 3 mm., the flagella 16 mm.; they are somewhat more than twice as long as the carapace. The outer border of the 2nd joint ends in a very small, subacute tooth, the stylocerite, that barely reaches to the proximal extremity of the 4th or penultimate joint, extending even not so far forward as the inner spine at the base of the scaphocerite. The small scaphocerite (Fig. 19*h*) is 0,5 mm. long and ends anteriorly in a sharp spine that, directed slightly inward, extends only along the proximal 4th part of the penultimate joint; the scaphocerite carries a smaller spine at the base of its inner margin. The penultimate joint is 0,9 mm. long and almost 3-times as long as thick, being 0,32 mm. thick in the middle and 0,35 mm. at the distal end; the last joint is a little more than half as long as the penultimate. The spine at the distal end of the inner margin of the 3rd joint is a little larger than the stylocerite, but the small spinule behind it has the same size as the latter. The flagellum is composed of 70 joints.

The ischium of the outer foot-jaws is armed on its inner border with 5 teeth, of which the 5th or foremost is a little smaller than the others that are subequal; in the female from Stat. 79b these teeth are rudimentary, but in the larger female from Amboina 3 or 4 are distinctly developed. In this female from Amboina the outer border of the merus ends in a short spine, long 0,1 mm., slightly curved downward, its length being $^1/_4$ that of the proximal margin that articulates with the ischium; in the females from the Stations 79b and 154 this spine is much smaller and may easily be overlooked. The inner margin of the merus is armed, in the female from Stat. 154, with 5 teeth, that gradually grow longer, the 5th being spiniform; in the larger female from Amboina there are also 5 teeth, but the three first are much smaller than the two foremost that are strong spines, nearly of equal length. The crest on the inner side of the ischium bears 17 teeth, that are rather obtuse, apparently worn off.

The anterior legs are wanting. The coxae of those of the 2nd pair carry a small spine at the base of their inner margin and 4 or 5 smaller teeth along it, nearly as in the specimens from Amboina. The lower border of the merus bears in both legs besides the small tooth at the distal end, 4 teeth of equal size, that are a little smaller than the distal one; for the rest these legs agree with the other specimens.

The coxae of the 3rd legs carry a very small tooth just before the genital aperture, 4 or 5 small teeth anteriorly and a few also on the margin that articulates with the 2nd joint. Near or on the lower margin of the propodus which is 3 mm. long, 9 spines are inserted, besides a larger one at the distal end; these spines are of somewhat unequal length and, two being accompanied by a smaller one, there are 11 spines at all and 4 short spines are placed along the distal half of the upper margin. The dactylus, 1,4 mm. long, is provided with 9 short spinules on its lower margin and 2 larger ones near the base on the outer side.

The 4th legs, a little shorter than the 3rd, carry a few minute teeth on the coxae and

6 similar minute teeth along the proximal half of the lower border of the ischium, that are only recognizable by means of the microscope. The merus, 3,5 mm. long and 7-times as long as broad, has also a small tooth at the far end of its lower border. The propodus, 2,7 mm. long, is more spinulose than that of the 3rd pair. Ten spines of unequal size occur along the lower border, some of them accompanied by a smaller one and the foremost even with two, so that there are 16 at all and moreover 2 larger spines of unequal length at the distal end; except near the proximal extremity 13 spines occur near the upper border, partly arranged likewise in sets of two. The dactylus is just as long as in the 3rd pair; it carries 10 spinules of equal length near the lower and 6 much larger ones near the upper margin.

The legs of the 5th pair agree with the description on p. 105, but the propodus is more spinulose. Merus 2,8 mm. long, 8-times as long as broad; carpus 1,4 mm. long, greatest breadth 0,33 mm. Propodus 2,7 mm. long, a little shorter than the merus, 0,29 mm. broad at the proximal extremity, 0,24 mm. just behind the middle and 0,36 mm. at the distal end. Nearly along the whole length of the lower margin, 9 or 10 spines are inserted, most of which are accompanied by one or two smaller ones, so that there are 20 at all; 5 or 6 small spines occur near the upper border. Dactylus 1,25 mm. long, with a strong spine near the base and a larger on the middle of the outer side, two smaller spinules near the tip on the upper border. Sternal plaque terminating anteriorly, on each side, in a sharp tooth. A sharp tooth, directed downward and backward, occurs near the base of the coxae of the 5th legs.

The appendages of the 1st somite are uniramous, but still much shorter and smaller than in the female with eggs; they are about 0,3 mm. long and taper somewhat from their base to their tip. Those of the four other somites are biramous, the rami lanceolate, narrow, subequal, devoid of a stylamblys; the pleopods of the 2nd somite carry no appendix masculina — so that this specimen is a female.

The preceding, detailed description of the specimens, collected by the Siboga-Expedition, and the reexamination of the typical specimens prove that *Axiopsis (Paraxiopsis) Brocki* is a much variable species.

Geographical distribution: Amboina (DE MAN); Bay of Batavia, Pulu Edam (DE MAN).

8. *Axiopsis (Paraxiopsis) bisquamosa* de Man. Pl. VIII and IX, Fig. 20—20*m*.

Axiopsis (Paraxiopsis) bisquamosa J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereeniging (2) Deel IX, Afl. 3 and 4, 1905, p. 597.

Stat. 133. July 25/27. Anchorage off Lirung, Salibabu-island. Up to 36 m. Bottom mud and hard sand. 1 male.

1 male and 2 ova-bearing females, collected 24 October 1896 by Mr. DAHL S. at Ralum, on the Gazelle-Peninsula, south of Rabaut, New Pommerania (N° 18713 of the Berlin Museum).

The male from Stat. 133, on which this species was established in 1905, will, as being the type, first been described.

This specimen is 10 mm. long; the carapace, 3,8 mm. long, is 1,5 mm. broad, the abdomen 6,2 mm. long, not yet twice as long as the carapace. The rostrum, (Fig. 20, 20*a*, 20*q*) that reaches almost to the distal end of 2nd antennular article, is narrow, triangular, with pointed,

slightly upturned tip and 0,48 mm. long, $^1/_8$ the length of the carapace; it is 0,3 mm. broad at the base, so that the rostrum is one and a half as long as broad at its base. The lateral borders that are slightly concave, first converge more rapidly, soon, however, slower, so that the greater anterior half appears rather narrow. At either side of the base of the rostrum the carapace carries a strong sharp tooth; both teeth are directed obliquely forward, their apices are 0,38 mm. distant from one another. Immediately in front of each tooth the lateral borders carry each four extremely small teeth that from the anterior to the posterior slightly decrease in size and that are of such a small size that they are only recognizable, in a lateral view of the body, by means of the microscope (Fig. 20*b*); between these minute teeth a few hairs are inserted. From either tooth at the base of the rostrum a barely prominent ridge runs backwards, both ridges diverge and reach only to the middle of the gastric region which they define anteriorly.

At a short distance behind the large basal teeth the gastric region carries at either side of the middle line a squamiform prominence or tubercle; the anterior edge of each prominence is regularly curved and falls steeply down (Fig. 20*a*), whereas the upper surface is continuous backward with that of the gastric region: it is from these two squamiform prominences that the specific name is derived. The anterior edge of these prominences is 0,88 mm. distant from the tip of the rostrum, i. e. $^1/_4$ the length of the carapace; they do not extend laterally to the lateral ridges, nor do they reach to the midline of the carapace. That part of the carapace which is situated in front of these prominences slopes oblique down, so that the rostrum is distinctly situated below the level of the gastric region. In front of these prominences and between the two rostral teeth, the carapace is distinctly carinate in the middle line, the sharp carina is not continued on to the rostrum and it soon fades away behind the anterior edge of the prominences; the whole remaining part of the carapace is not carinate, but rounded above. The quite distinct, cervical groove is 1,36 mm. distant, in the middle line, from the tip of the rounded lobe at the end of the carapace, this distance is a little more than $^1/_3$ the length of the latter. Anterior border of the carapace unarmed. At either side the gastric region carries a longitudinal row of puncta, for the rest it is smooth and the punctation of the branchial regions is also rather indistinct.

The narrow abdomen is rounded above and the 2nd—6th somites are of a subequal length; the 6th is a little broader than long. The abdomen is smooth, being only a little punctate, especially on the well developed, flattened pleura. The pleura of the 1st somite are subacute; the 3rd—5th pleura carry a small, sharp tooth at the angle that their anterior border makes with the lower, a similar tooth occurs at the lower end of the 6th; the posterior margin of the pleura is barely curved and makes an obtuse angle with the lower.

The caudal fan (Fig. 20*c*) resembles somewhat that of *Axiopsis Brocki*. The telson is 1,28 mm. long, the sharp tooth on the middle of the posterior border included and 1,18 mm. without it; this tooth is 0,08 mm. long and attached to the lower surface. The telson shows its greatest width of 0,92 mm. anteriorly, so that it appears almost one and a half as long as broad; the lateral margins converge slightly backward, so that the telson is only 0,7 mm. broad at their posterior extremity, i. e. at the tips of the last teeth. The lateral margins are namely armed with 4 sharp, immobile teeth of equal size, of which the 4th is situated at their posterior extremity; the 2nd is twice as far distant from the 1st as from the

3rd, which is situated somewhat nearer to the 4th than to the 2nd. Close by the 4th a somewhat larger, movable tooth is inserted, which is 0,1 mm. long, nearly equal in length to the median tooth attached on the middle of the rather much convex posterior margin; the latter is fringed as usual with articulated, ciliated setae and carries at either side a tuft of longer plain hairs. The upper surface of the telson carries two pairs of teeth; the anterior pair, a little nearer to the anterior than to the posterior margin and midway between the 1st and 2nd teeth of the lateral margins; the teeth of the posterior pair that are twice as far distant from one another as those of the anterior, are implanted at the level of the 2nd of the lateral margins. The telson is furnished with some symmetrically arranged setae and tufts of setae.

Of the caudal swimmerets that are not longer than the telson, the outer is obovate, rounded apically, narrowed at the base; the somewhat arched, anterior margin is armed with 4 sharp teeth and, as usual, a somewhat larger, movable tooth, 0,16 mm. long, occurs close by the 4th at the distal end. Seven sharp teeth, somewhat unequal in length, stand along the straight transverse suture, the longitudinal ribs are unarmed above. The anterior edge of the more ovate endopod is armed with 3 teeth, of which that at the distal end is a little larger than the preceding; the longitudinal rib that runs down in the middle, carries 4 strong teeth.

The eyepeduncles are very short and do not extend to the middle of the rostrum, so that, looked at from above, only the globular, distinctly faceted black eyes are visible; they barely reach beyond the strong teeth at the base of the rostrum.

The internal antennae are 4,4 mm. long, a little longer than the carapace, the peduncle 0,9 mm., the longer flagella 3,5 mm.; the outer margin of the expanded first article of the peduncle ends in a small sharp tooth and the lower margin carries at the distal end also a sharp tooth that is directed inward; the 2nd and the 3rd joint are equal, together nearly as long as the 1st and the flagella consist of 22 or 23 joints.

The external antennae are 7,3 mm. long, nearly twice as long as the carapace, the peduncle measuring 1,5 mm., the flagellum 5,8 mm. The outer border of the 2nd joint of the peduncle ends distally in a minute tooth, so small that it may easily be overlooked, when the animal is viewed at from above; in a lateral view this tooth, the stylocerite, may be observed the best (Fig. 20*a*). The scaphocerite, 0,15 mm. long, ends anteriorly in a sharp point and carries no tooth on its inner side; it is relatively still smaller than in *Ax. Brocki*, because the pointed extremity barely reaches beyond the articulation of the penultimate joint. This joint, the 4th, is 0,56 mm. long, cylindrical, 0,125 mm. broad or thick, so that this joint, which is 4-times as long as thick, has a more slender shape than that of *Ax. Brocki*; the terminal joint, 0,34 mm. long, measures $^2/_3$ the preceding. The flagellum, one and a half as long as the carapace, is composed of 35 joints.

Ischium and merus of the external maxillipeds (Fig. 20*d*) are almost equally long; the inner border (Fig. 20*e*) of the ischium carries a small sharp tooth a little nearer to the proximal than to the distal end and one or two still smaller teeth, behind one another, at the base. The merus is armed on the distal half of its inner border with two strong spiniform teeth, of which the anterior is slightly larger than the other. Carpus and propodus are of equal length, the dactylus a little shorter and the carpus is unarmed; the strong crest on the inner surface of the ischium is armed with 18 sharp teeth, of which the proximal ones are

very small and which, as usual, increase in size distally; proximally a few small teeth exist moreover between the crest and the outer margin.

Of the anterior legs the left is wanting, excepting the coxa. The coxae of both legs carry a minute tooth near the base and another at the distal end of their inner border. The right leg (Fig. 20*f*) is large and stout, 7 mm. long, $^2/_3$ the length of the body. Ischium with a small sharp tooth at the distal end of its lower border. The merus has a stout shape; it is 1,7 mm. long, 0,6 mm. broad at the base that articulates with the ischium, whereas its greatest breadth at the niveau of the anterior tooth is 0,9 mm. without it and 1 mm. when that tooth is included; the distal extremity articulating with the carpus is just as broad as the proximal. Immediately beyond the middle, the lower border carries a subacute tooth of medium size, as large as the tooth of the ischium; between this tooth and the proximal extremity the lower border is coarsely serrate by 7 smaller teeth of equal size. The lower margin of ischium and merus bears a few setae and there is a tuft of setae at the distal end of the arched, unarmed, upper border of the merus. The carpus is short, 0,9 mm. long, and a little broader, viz. 1,06 mm., on the distal border that articulates with the chela; the lower border of the carpus bears 2 or 3 small, subacute teeth and is notched or emarginate between these teeth and the distal end. The large and massive chela is 3,45 mm. long, as long as the carapace, the palm being 2,2 mm. long and 1,4 mm. broad; the upper and the lower border of the palm which is one and a half as long as broad and a little longer than the fingers, are obtuse, not carinate and run parallel with one another, whereas the lower is continued in a straight line with that of the immobile finger. The fingers taper regularly to their pointed extremities, that cross one another, when the fingers are shut; dactylus strongly arched. The immobile finger carries (Fig. 20*n*) a dozen of very small, subacute teeth along the two proximal thirds of its cutting-edge, of which the 5th is somewhat larger than the rest; similar teeth occur on the dactylus, though still smaller, one or two near the base are a little larger than the others and one observes on the middle of the cutting-edge moreover 6 or 7 short, stiff setae or spines. The lower border of the immobile finger is ridged on its proximal half. The outer side of the palm is smooth, one observes, however, a row of large puncta parallel with and not far from the lower margin, smaller puncta occur near the upper border; excepting a few small puncta the inner side is also smooth. Fingers smooth, dactylus not carinate above.

The legs of the 2nd pair, that are fringed with long hairs along their lower border, the carpus and the chela also on their upper, agree with those of *Ax. Brocki*, but the merus, that is 1,9 mm. long and 5-times as long as broad, presenting its greatest width of 0,39 mm. at $^1/_3$ its length from the distal end, has its lower margin quite unarmed. The carpus is 1,06 mm. long and somewhat more than 3-times as long as broad (0,3 mm.); the chela is 1,32 mm. long, 4-times as long as broad (0,32 mm.) and a little longer than the carpus. The fingers, 0,6 mm. long, are a little shorter than the palm, the immobile finger carries a dozen of small, spiniform, movable teeth along its whole length, the dactylus 6 or 7 along the distal half of its cutting-edge.

The following legs resemble also much those of *Ax. Brocki*, but the meri are unarmed and they are less spinulose. The meri of the 3rd pair (Fig. 20*g*) are 1,9 mm. long, just as

long as those of the 2nd and 5,3—5,4-times as long as broad; carpus 0,88 mm. long, 4-times as long as broad. The propodus, 1,26 mm. long, is 6-times as long as broad, its lower border carries 6 movable spines, of which the spine at the distal end, 0,18 mm. long, appears about twice as long as the preceding; both margins present also some hairs. The nearly straight dactylus (Fig. 20*h*) is 0,58 mm. long, almost half as long as the propodus, and its breadth at the base is $^1/_6$ its length; it carries a row of 4 or 5 spinules and some setae.

The merus of the 4th pair is 1,7 mm. long and 5-times as long as broad; the carpus is 0,9 mm. long and almost 4-times as long as broad. The propodus, 1,3 mm. long, is 6-times as long as broad and one and a half as long as the carpus; the lower margin carries 7 movable spines, of which that at the distal end is nearly twice as long as the preceding. A tuft of ciliated bristles is implanted at the distal end of the lower margin and both margins carry some setae. The nearly straight dactylus, 0,61 mm. long, is half as long as the propodus and its breadth at the base $^1/_6$ its length; besides some hairs, it carries 3 small, movable spines along the middle of its lower margin and 2 larger ones near the middle of the upper.

The merus of the 5th pair is 1,25 mm. long and 5-times as long as thick; the carpus is 0,7 mm. long and its greatest width, a little beyond the middle, 0,21 mm., so that this joint appears almost 3-times as long as broad. The propodus (Fig. 20*i*), just as long as the merus, gradually broadens somewhat towards the distal end; it is 0,18 mm. broad in the middle and 7-times as long as broad. The distal end, 0,2 mm. broad, is on the inner side covered with ciliated bristles, arranged in a row that runs obliquely from the distal end of the upper border to the lower; 5 movable spines are implanted along the distal half of the lower margin, a small one in the middle, the following longer, one at the distal end; a few setae on both margins. The dactylus, nearly straight and half as long as the preceding joint, is armed with a small movable spine on the upper border not far from the tip and 2 larger ones on the outer side, one, 0,12 mm. long, in the middle, the other midway between it and the articulation.

The 1st abdominal somite bears no appendages. Those of the 4 following are biramous, the rami almost equal, narrow, lanceolate, fringed with long, plumose hairs. The two rami of the 2nd pleopod (Fig. 20*j*) are nearly equal; the exopod is 0,8 mm. long and presents its greatest width of 0,17 mm. at $^1/_4$ its length from the base and this width is $^1/_5$ the length. The endopod, 0,85 mm. long, has the same form and carries an appendix masculina, long 0,18 mm. and 4-times as long as thick, at $^1/_3$ the length of the endopod from the base. The pleopods of the 3rd—5th somites resemble those of the 2nd and are likewise destitute of a stylamblys.

The male, collected at Ralum, New Pommerania, is also 10 mm. long. The rostrum extends also about to the middle of 2nd antennular article, but appears a little shorter than the distance (0,42 mm.) between the tips of the large basal teeth, the rostrum being 0,38 mm. long. The 2nd pleopods agree with those of the type; the protopod is 0,7 mm. long; 0,24 mm. broad, 3-times as long as broad, the exopod also 0,7 mm. long, but 4-times as long as broad, the endopod 0,72 mm. long, 0,17 mm. broad, appendix masculina 0,13 mm. long, of a somewhat stouter shape, being only $2^1/_2$-times as long as broad; the longest setae on the tip of this appendix 0,4 mm. long.

The larger egg-bearing female is about 16 mm. long, carapace 6 mm., abdomen about

10 mm. The rostrum (Fig. 20*l*, 20*m*) that nearly reaches to the distal extremity of 1st antennular article, is 0,36 or 0,38 mm. long, but the distance between the apices of the two basal teeth measures 0,65 mm., so that, otherwise than in the male, the rostrum appears about one and a half as broad at its base than it is long. The lateral margins are not denticulate, but carry a few minute prominences from which the setae arise. At $^1/_6$ its length from the tip of the rostrum the upper surface of the gastric region slopes obliquely and rather steeply downward to that tip, the slope being higher and steeper than in the male. In a lateral view the carapace appears half as high as long. Like in the male the anterior half of the gastric region is carinate in the middle line, but the characteristic squamiform prominences that occur in the male there where the gastric region slopes downward, are wanting in the female.

Telson as in the male, but the lateral margins bear only 3 teeth, that are also smaller, less prominent; likewise the teeth on the anterior edge of both uropods are smaller, 10—12 teeth occur along the transverse suture of the outer uropod.

Eyes brown, reaching to the middle of rostrum.

The peduncles of the two pairs of antennae agree with those of the male and the flagella of the inner antennae consist each of 23 joints. External maxillipeds as in the male.

Legs of 1st pair wanting. The merus of 2nd legs, measured along its upper border, proves to be 2,6 mm. long and 4,3-times as long as its greatest width at $^1/_3$ its length from the distal end; carpus 1,52 mm. long, 0,45 mm. broad,, 3,4-times as long as broad; chela 1,7 mm. long, palm 1 mm. long, a little longer than the fingers and in the middle just as broad as the carpus. The following legs apparently like in the male.

First abdominal somite with two uniramous slender appendages that are 1,4 mm. long, with some setae at the extremity. The pleopods of the following somites present a more slender form than in the male, the endopods are devoid of a stylamblys, but at the spot where in other species a stylamblys is implanted, a few long setae occur. So e. g. the exopod of the 2nd pleopod is 1,35 mm. long, 6,7-times as long as broad, the endopod 1,55 mm. long, 8-times as long as broad, protopod also more slender than in the male.

Eggs 0,56 mm. long, 0,42 mm. broad, or 0,56 mm. long, 0,48 mm. broad or 0,62 mm. long, 0,42 mm. broad.

The other female with eggs is only 13 mm. long and agrees with the described one, excepting the telson, the lateral margins of which are armed with 4 teeth as in the male, these teeth, however, as small as in the other female. Anterior legs also wanting.

Calocaris Bell.

The genus *Calocaris* Bell is at present divided into two subgenera *Calocaris* s. s. and *Calastacus* Faxon, that chiefly differ by the antennal thorns being small in the former, large in the latter. The subgenus *Calocaris* contains 4 species or perhaps 5, when the Indian form of *Cal. Macandreae* Bell should prove to be a proper species. This *Cal. Macandreae*, the type species of the genus, is recorded from the Gulf of St. Lawrence, 20 miles southwest of the southwest point of the island of Anticosti and from south of West Iceland; it occurs on the west and south coasts of Norway, in the Kattegat, the North Sea, on the coasts of Great

Britain, in the Mediterranean and even in the Adriatic. According to Professor Alcock this species should also occur in the Arabian Sea and in the Bay of Bengal, but the characters, mentioned by him for these indian specimens, do not fully agree with those of the european species, so that it appears highly probable that they should be considered as a distinct species or at least as a distinct variety, as was already suggested by the lamented Selbie in 1914. On the coast of the Cape Colony this genus is represented by *Cal. Barnardi* Stebbing, while the Bay of Bengal is still inhabited by a second species, *Cal. Alcocki* McArdle, a form also recorded from Cape Natal, South Africa. The fourth species, finally, *Cal. aberrans* Bouv., is found at Santa Lucia, Antilles, and so named, because the carina, characteristic of the genus, on the hinder part of the carapace is wanting at all.

In 1893 the genus *Calastacus* was established by Dr. Faxon for *Cal. stilirostris*, obtained off Acapulco; this genus, however, should be considered as a subgenus of *Calocaris*. Still a second species, *Cal. quinqueseriata* (Rathb.), occurs on the west coast of North America, from off Point Sur to Anacapa Island, Southern California. The 5 other species of this subgenus are Indopacific. *Cal. euophthalma* (de Man) was taken north of Batjan Island, at this locality still another species, *Cal. Sibogae* n. sp. was obtained, allied to *Cal. felix* (Alcock & Anders.) that inhabits the Arabian Sea, off Cape Comorin. The Arabian Sea, however, is the habitat of still 2 other species, viz. of *Cal. Investigatoris* (Anders.), which, remarkable fact indeed, is also recorded from the coasts of Alaska, Oregon and California, and of *Cal. longispinis* (McArdle), a form also obtained in the Gulf of Oman and on Table Mountain, South Africa.

The typical european *Calocaris Macandreae* Bell has, as C. M. Selbie writes (The Decapoda Reptantia of the Coasts of Ireland, 1914, p. 95), a wide vertical range, extending from about 25—30 down to 600—700 fathoms. The specimens, obtained by the *Helga* off the coasts of Ireland, were taken in comparatively shallow water from about 30—80 fathoms, excepting a single individual, captured off the southwest coast at a depth of 447—515 fathoms. South of West Iceland it was taken at a depth of 589 fathoms. The indian specimens, referred by Col. Alcock to *Cal. Macandreae*, were found in 636 down to 800 fathoms. *Cal. Barnardi* Stebbing was taken at the moderate depth of 89, *Cal. Alcocki* McArdle in 440 and 542, the west-indian *aberrans* Bouv. in 422 fathoms.

The species of the subgenus *Calastacus* are in general found at great depths, the first described *stilirostris* Faxon occurs at a depth of 660 fathoms, *Cal. Investigatoris* was taken in 947 but also in 345 fathoms, the two species, finally, observed in the Indian Archipelago, were captured at a depth of 217 fathoms.

Key to the known species of the subgenus *Calocaris* Bell s. s.

a_1 Median carina in the hinder part of the carapace well developed, extending from the cervical suture to the posterior margin.

b_1 Rostrum upcurved.

c_1 Lateral margins of the rostrum armed proximally with 2 spines and continued as prominent divergent ridges on the gastric area that are armed with 2 similar spines. Penultimate joint of antennal peduncle almost twice as long as 2nd and about

3-times as long as 5th. Chelipeds not slender, dactylus more than twice to three times as long as that shorter part of the palm to which it is attached.

d_1 Rostrum reaching very nearly to the end of the antennular[1]) peduncle. Merus of 1st pair of legs with a row of 5 or 6 teeth on the lower border . . . . . *Macandreae* Bell. European form.

(TH. BELL, A History of the British Stalk-eyed Crustacea, London 1853, p. 233. — C. M. SELBIE, The Decapoda Reptantia of the Coasts of Ireland. London 1914, p. 92, Pl. XIV, figs. 5—7).

d_2 Rostrum reaching the end of the basal joint of the antennular[2]) peduncle. Merus of 1st pair of legs with 2 or 3 spinules on the lower border . . . . . *Macandreae* Bell. Indian form.

(A. ALCOCK, A descriptive Catalogue Indian Deep-Sea Crustacea. Decapoda Macrura and Anomala in the Indian Museum. Calcutta 1901, p. 189).

c_2 On either lateral border of the rostrum, near the middle, are 1 or 2 spines and on each of the epigastric continuations of the lateral borders is a single spine. Penultimate joint of antennal peduncle almost 3-times as long as 2nd and 5- to 6-times as long as 5th. Chelipeds slender, palm as long as the fingers *Alcocki* McArdle.

(A. F. MCARDLE, in: Annals Mag. Nat. Hist., Ser. 7, Vol. 6, 1900, p. 476. — A. ALCOCK, l. c. 1901, p. 190. — Illustrations Zoology Investigator, Crustacea, Pl. L, 1901, fig. 4).

b_2 Rostrum straight, horizontal.

Penultimate joint of antennal peduncle only a little longer than 2nd and twice as long as the 5th. Chelipeds not slender, dactylus one and a half as long as that shorter part of the palm to which it is attached. . . . . *Barnardi* Stebbing.

(TH. R. R. STEBBING, Annals South African Museum, Vol. XV, 1914, p. 9, Pl. LXVI).

a_2 No median carina on the hinder part of the carapace behind the cervical suture. Rostrum triangular, narrow, the margins armed each with 3 spines and continued on the gastric area as a short carina, that bears a large acute tooth. . . . . *aberrans* Bouv.

(E. L. BOUVIER, Compt. Rend. Acad. Sciences de Paris, T. 141, 1905, p. 802—806).

Key to the known species of the subgenus *Calastacus* Faxon.

a_1 In front of the spine at either side of its base the lateral margins of the rostrum are unarmed[3]). Median dorsal carina of the carapace reaching backwards beyond the cervical groove. Eyes devoid of pigment.

---

1) In Mr. SELBIE's work, p. 92, line 16 from below, instead of "antennal" read "antennular".

2) The same mistake, mentioned in note 1, is apparently committed by Col. ALCOCK, for when the rostrum should reach only the end of the basal joint of the antennal peduncle, there should be no rostrum at all.

3) In the figure 1 on Plate XXV of the "Illustrations of the Zoology of the Investigator", representing *Calastacus Investigatoris* (Anderson) in a lateral view, a small tooth is visible near the tip of the rostrum; in Prof. ALCOCK's description, however, of 1901 this tooth (or teeth) is not mentioned. ANDERSON's original description of 1896 is not at my disposal.

b_1 Posterior to the spine at either side of the base of the rostrum no other spine occurs. Scaphocerite reaching nearly the end of 4th joint. Eyes rudimentary, subglobose, devoid of corneal facets. *stilirostris* Faxon.

(W. Faxon, in: Memoirs Museum Compar. Zoology at Harvard College, Vol. XVIII, Cambridge 1895, p. 106, Pl. XXVII, fig. 1—1*f*).

b_2 Posterior to the spine at either side of the base of the rostrum still another is observed on the epigastric continuations of its lateral margins. Scaphocerite shorter than the stylocerite and hardly reaching a fourth of the way along the 4th joint[1]). The eyes form a colourless flange to the end of the short fixed eyestalks . . . . . *Investigatoris* (Anderson).

(A. Alcock, A descriptive Catalogue Indian Deep-Sea Crustacea. Decapoda Macrura and Anomala, Calcutta 1901, p. 191. — Illustrations Zoology of the Investigator. Crustacea Pl. XXV, fig. 1, 1*a*).

a_2 In front of the spine at either side of its base the lateral margins of the rostrum are armed with spines. Median dorsal carina of the carapace distinct on the gastric area and at the posterior border. Eyes often pigmented.

c_1 Each of the epigastric continuations of the lateral borders of the rostrum carries two spines.

d_1 Lateral margins of the rostrum in front of the spine at the base armed with 2 spines. On the gastric region behind the spines at the base of the rostrum is a horseshoe of spines, consisting of one or more spines anteriorly on the median carina and of a submedian row of 4 spines at either side of it.

e_1 The eyes show as an irregular speck of pigment on the outer side of the tip of the short fixed eyestalks. According to the figure 3 on Plate XLII of the "Illustrations Zool. Investigator" the stylocerite should hardly reach a fourth of the way along the 4th joint and the longer scaphocerite should extend to just beyond the middle of it. Fingers of the chelipeds of the female as long as the palm, the fixed finger the tip of which is truncated, has near its proximal end 2 or 3 small teeth, followed by a much enlarged one *felix* (Alcock & Anderson).

(A. Alcock, l. c. 1901, p. 192. — Illustrat. Zool. Investig. Pl. XLII, fig. 3. 1899).

e_2 Eyestalks movable, reaching to just beyond the middle of the rostrum, cornea dark-brown, occupying nearly $^1/_3$ the length of the stalk. Stylocerite reaching two-thirds the way along the 4th joint, the longer movable scaphocerite reaching almost to the end. Fingers of the chelipeds of the female one and

1) In my opinion the words scaphocerite and stylocerite have been taken the one for the other in Col. Alcock's description of *Cal. Investigatoris*, that I deduce from his contending that the antennal thorns of *Cal. felix* should agree with those of *Cal. Investigatoris*, while in the figure of *Cal. felix* in the "Illustrations" the scaphocerite extends distinctly beyond the middle of the 4th joint. I must, however, remark that in the figures 1 and 1*a* on Plate XXV of the "Illustrations" the scaphocerite is quite invisible.

a half as long as the palm; the fixed finger, the tip of which is acuminate, bears a large acute tooth near its proximal end followed by three smaller ones . . . . . *Sibogae* n. sp.

d_2 Lateral margins of the rostrum in front of the spine at the base armed with more than 2 spines. Eyestalks movable.

f_1 Margins of the rostrum with 5 spines on either side in its free portion. Median carina with a single blunt spine near its beginning; between it and the lateral carinae on either side a longitudinal row of 3 small spines. Eyestalks more than half as long as the rostrum. Stylocerite extending for a short distance over the 4th joint, scaphocerite reaching nearly to the end of this joint[1]). . . . . *longispinis* (McArdle).

(A. F. McArdle, Annals Mag. Nat. History (7) VIII, 1901, p. 522. — Illustrations Zool. Investigator, Crustacea, Pl. LVII, fig. 2, 2*a*. 1902.

f_2 Left margin of the rostrum with 3, right with 2 spines on either side in its free portion. Median carina with 2 spines, behind which a low blunt tubercle; between this carina and the lateral on the left side 2, on the right 4 spines. Eyestalks reaching almost to the middle of the rostrum. Stylocerite reaching almost to the middle, scaphocerite almost to the end of 4th joint . . . . . *euophthalma* (de Man).

c_2 Each of the epigastric continuations of the lateral borders of the rostrum armed with 5 or 6 spines.

Median carina from 2 to 6 (usually 3) spined at its middle. Between the median carina and each of the lateral a submedian row of 3 to 5 spines. Lateral margins of the rostrum with 3 to 7 spines. The eyes are colorless and form a globular tip to the short eyestalks . . . . . *quinqueseriata* (Rathb.).

(M. J. Rathbun, Decapod Crustaceans of the Northwest coast of North America. New York 1904, p. 151, fig. 91).

1. *Calocaris (Calastacus) Sibogae* n. sp. Pl. IX, Fig. 21—21*e*.

Stat. 139. August 4. Lat. 0° 11′ S., long. 127° 25′ E. North of the Island of Batjan. 397 m. Bottom: mud, stones and coral. 1 female without eggs.

The nearest allied species is *Cal. (Calastacus) felix* (Alcock & Anders.), of which we possess a description in Prof. Alcock's work of 1901 "A descriptive Catalogue of the Indian Deep-Sea Crustacea. Decapoda Macrura and Anomala in the Indian Museum, p. 192" and two good figures 3 and 3*a* on Plate XLII of the "Illustrations of the Zoology of the Investigator, Calcutta 1899". The female from Stat. 139, measured in the middle line, proves to be 29,5 mm. long, the carapace being 12,5 mm. long, the abdomen 17 mm.; carapace almost as long as the first 6 abdominal somites. The slender rostrum (Fig. 21), that measures a little more than

1) As is clearly proved by the figure 2*a* on Plate LVII of the "Illustrations", also Captain McArdle has confounded the words scaphocerite and stylocerite with one another.

1/4 the length of the rest of the carapace and that reaches to the middle of the last joint of the antennular peduncle, is armed with two slender spines on either side in its free portion, one a little in front of the middle, the other just behind it near the base and the slender, pointed tip is curved upward; on each of its lateral prolongations on to the gastric region one observes two other similar spines, the anterior, immediately behind the anterior border of the carapace, is placed much nearer to the posterior spine of the free portion than to the other. The anterior spine of the free portion is about one and a half as far distant from the posterior as the latter from the anterior spine of the lateral prolongations and as its distance from the tip of the rostrum. All these spines are directed forward and upward, between them lank antrorse setae spring from the margins of the rostrum. The somewhat smaller and shorter spines, arranged like in *Cal. (Calastacus) felix* in the form of a horseshoe on the gastric region, are also four in number on either side besides the anterior spine on the carina of the middle line; this spine stands immediately behind a line uniting the anterior pair of spines on the lateral prolongations of the rostrum. On the left side of the median anterior spine of the horseshoe there is still another of the same size and on the right side still a very small rudimentary one. Of 2 or 3 of these spines the tips are broken off. Posterior to the median anterior spine of the horseshoe the median carina carries anteriorly two small spines and a little more backward a small blunt tubercle. The median carina runs from the middle of the free portion of the rostrum backward, not reaching as far as the cervical groove, but it appears again for a short distance on the posterior border of the carapace. The lateral sides of the carapace are rather coarsely pitted, especially anteriorly; the upper surface of the rostrum is smooth, like also that of the horseshoe between the transverse tufts of hair upon it; these hairs are generally rather short, though somewhat longer than the scanty hairs on the lateral sides of the carapace. In two tufts, however, that occur between the penultimate lateral spine of the horseshoe and the median carina the hairs are considerably longer, as long as those on the lateral margins of the rostrum. The horseshoe of spines is bounded anteriorly by a semilunar area of transverse rugae, that reaches as far forward as the base of the anterior spine on the prolongation of the lateral margin of the rostrum. The posterior part of the upper surface of the carapace behind the horseshoe is also somewhat pitted.

The abdominal terga, subcarinate in *Cal. felix*, are rounded above, without any trace of a median carina; they are separated, however, from the broad and somewhat angular pleura by distinct sublateral carinae. Telson quadrangular, somewhat longer than broad, broadly rounded off; it carries a pair of small spinules on either side, somewhat in front of the middle, and several tufts of lank setae; there is a spine at either postero-lateral angle and two smaller ones on the distal half of the lateral edges. Uropods as long as the telson. The straight entire, hairy, outer edge of the inner uropod ends at its posterior extremity in a strong spine and a shorter one occurs on the right uropod, not on the left, on the outer edge immediately in front of it; the thickened midrib is smooth, but ends in a strong spine quite near the posterior border of the plate. There are 2 or 3 small spinules on the somewhat arcuate, outer border of the outer uropod and the transverse suture is bounded by a row of 10 or 11 spinules arranged in two sets that are separated by an unarmed interspace; the two thickened ribs on the upper surface are also smooth and unarmed.

The movable eyepeduncles, 1,4 mm. long, extend a little beyond the middle of the free portion of the rostrum, but do not yet reach the distal extremity of 1st antennular article; the cornea, that occupies $^1/_3$ the length of the peduncle, is distinctly faceted and shows a dark-brown pigment, that, however, anteriorly is somewhat paler. In *Cal. felix* the peduncles are much shorter, fixed and show as an irregular speck of pigment on the outer side of their tip.

The coxa and basis of the external maxillipeds (Fig. 21*a*) carry each a spine at their antero-internal angle; the ischium, 1,8 mm. long and 0,48 mm. broad, is armed with a rather small spine about on the middle of its inner margin and with a smaller one somewhat behind it (Fig. 21*c*). The merus, 2 mm. long and 0,5 mm. broad in the middle, is armed with one single spine, a little larger than those of the ischium, just before the middle of the inner border; the three last joints are respectively 1,4 mm., 1,3 mm. and 0,92 mm. long, the terminal joint being the shortest of all, and the carpus that is 0,5 mm. thick, is quite unarmed. The strong crest at the inner side of the ischium projects a little beyond the distal end of this joint and is armed with 20 strong teeth, the 10 or 12 anterior teeth are nearly of the same size, the 10 posterior become gradually smaller. The slender exopod reaches to the middle of the carpus of the endopod, the stalk, 1,7 mm. long, is 10-times as long as broad, the flagellum, 2,75 mm. long, is formed by 16 joints of which those in the middle of the flagellum are a little broader than long.

Inner antennae 15,5 mm. long. The antennular peduncle is 2,4 mm. long, the 1st article that is 1,5 mm. long and the unarmed, expanded, basal portion of which reaches almost to the middle of the article, is somewhat longer than the two following combined and almost 3-times as long as the 2nd; 3rd article as long as 2nd. The light-red flagella are as long as the carapace, rostrum included.

The antennal peduncle projects by the terminal joint beyond that of the inner antennae. The 1st joint carries on the middle of the anterior margin of its lower side a short spine, 0,28 mm. long, that is slightly curved inward and the inner border of the 2nd joint ends anteriorly in a straight slender spine of the same length. The pointed stylocerite reaches a little beyond the middle of the penultimate joint, which is 1,6 mm. long; the slender scaphocerite, 1,4 mm. long, reaches somewhat beyond the stylocerite and four fifths of the way along the penultimate joint. The terminal joint, finally, measuring 0,9 mm., is a little more than half as long as the penultimate, that presents some hairs along its inner border and some also at its anterior extremity; the flagella are lost [1]).

The anterior legs are equal and 19 mm. long, measuring two-thirds the length of the body (Fig. 21*d*); they project by their carpus and chelae beyond the tip of the rostrum. The ischium carries a spine near the distal end of its lower border, the merus 3 spines on the lower border that slightly grow longer distally; at the inner side of these spines the lower border is

1) According to ALCOCK's description of 1901 in *Cal. felix* (Alcock & Anders.) the scaphocerite and stylocerite should be similar to those of *Cal. Investigatoris* (Anders.); in this species, however, "the scaphocerite, which is shorter than the stylocerite, hardly reaches a fourth of the way along the penultimate joint" (ALCOCK, l. c. p. 192). In the figure 3 on Plate XLII of the "Illustrations" the scaphocerite appears in *Cal. felix* distinctly longer than the stylocerite which, indeed, hardly reaches a fourth of the way along the penultimate joint. We must therefore suppose that the names scaphocerite and stylocerite have been confounded by the author. For the rest in the two figures 1 and 1*a* of *Cal. Investigatoris* on Plate XXV of the "Illustrations" a movable scaphocerite is not visible at all!

fringed with hairs. The merus, which on its outer surface appears half as broad as long, has a very sharp upper border and this border is armed on the left leg with one, on the right with two spines near the distal end, placed behind one another; between the posterior spine and the proximal extremity the border presents moreover 3 very small, subacute teeth, one immediately behind the posterior spine, the two others near one another on the middle of the border. A small spine occurs also close by the distal border of the outer surface, a little nearer to the lower than to the upper border. The carpus has a spine on the middle and another at the distal end of the upper border; its flattened lower surface projects inward as a blunt tooth and the external hairy edge carries at the distal end a small spine, on that of the right leg even two. The chelae are 9 mm. long, three-fourths the length of the carapace; the palm is 4 mm. long and a little less high at the articulation of the fingers. The upper border of the palm is armed with 3 or 4 spines arranged in two rows and one observes moreover a short acute tubercle or spine on the outer side just near and below the articulation of the dactylus, that also occurs in *Cal. felix* according to the figures in the "Illustrations". The fingers, nearly one and a half as long as the palm, taper and terminate in very slender pointed extremities; the immobile finger is a little curved upward, the dactylus, however, strongly curved downward at the apex and the fingers cross one another. The dactylus of the left leg is armed along the proximal half of its cutting-edge with three obtuse teeth, that gradually decrease in size, on that of the right leg (Fig. 21*d*) there is but one small acute tooth situated about at the proximal fourth of the cutting-edge. The fixed finger is armed with four sharp teeth, the 1st, not far from the base of the finger, is the largest of all, the following decrease gradually in length and size, the 4th tooth stands a little farther from the tip than the 1st from the base of the finger. The outer side of the palm is separated from the flattened lower surface by a ridge that is prolonged on to the fixed finger till near its tip. As in *Cal. felix*, all that part of the chelipeds which lies beyond the carapace is rather thickly setose; the inner surface of the palm, however, is smooth and glabrous. The setae, arranged in tufts, are longest on the fingers and of a dark-brown colour.

The meri of the 2nd legs reach as far forward as the eyes; these slender joints that are 6,1 mm. long and 7-times as long as broad, are armed with one single spine on the anterior border, that is fringed with long hairs; a few hairs exist also on the distal end of the posterior or upper border. The unarmed carpus (Fig. 21*e*) is 3,2 mm. long, half as long as the merus, and 0,68 mm. broad at the distal end, i. e. about $^1/_5$ its length. The chelae are 3,4 mm. long, a little longer than the carpus; the palm is 2,1 mm. long, 0,61 mm. broad at the proximal end, 0,82 mm. at the articulation of the fingers. The fingers measure two-thirds the length of the palm; the fixed finger carries 22 small, short, movable spines along the whole length of its cutting-edge, all about of the same size, on the dactylus similar spines occur along the larger distal half of its cutting-edge. Carpus and chelae are fringed with long hairs along their anterior and posterior borders.

The legs of the 3rd pair are little shorter than those of the 2nd, the meri of the 4th pair reach to the middle of those of the 3rd, the meri, finally, of the 5th pair extend only along $^1/_5$ the length of those of the 4th; the meri of the 3rd and 4th pairs carry a few hairs at the distal end of their upper border and a few on their lower. The legs of the 3rd and 4th pair

carry, besides some long setae, some squamiform rows of short, stiff bristles on the outer side of their propodi, the dactyli also a longitudinal row of them on their outer side; the slender, somewhat arcuate dactyli of the 3rd pair are 1,4 mm. long, the propodi 3,3 mm. The propodi of the 5th pair are 3,5 mm. long and 0,34 mm. broad in the middle; they are somewhat enlarged at the distal end of their lower border, being here 0,55 mm. broad and thickly covered with ciliated setae along the distal third of the latter. The somewhat arcuate dactylus of the 5th pair is 1 mm. long and there are some long hairs on its upper border.

Pleopods of 1st abdominal somite slender and uniramous, those of the four following pairs slender, biramous and provided with a slender styliform stylamblys.

2. *Calocaris (Calastacus) euophthalma* (de Man). Pl. X, Fig. 22—22*g*.

Calastacus euophthalmus J. G. de Man, in: Tijdschr. d. Ned. Dierk. Vereen. (2) Dl. IX, Afl. 3 en 4, 1905, p. 598.

Stat. 139. August 4. North of the island of Batjan. Lat. 0° 11′ S., long. 127° 25′ E. 397 m. Bottom: mud, stones and coral. 1 male.

Carapace (rostrum included) 8,5 mm. long, abdomen 12,5 mm., whole length 21 mm; the carapace is as long as the distance between its posterior end and the middle of 6th abdominal somite. The rostrum (Fig. 22, 22*a*), that measures exactly $^1/_4$ the length of the rest of the carapace, reaches to the distal end of 2nd antennular article; its form and characters are the same as in *Cal. Sibogae*, but there is a third spine on the left border of the rostrum, immediately behind the foremost one, and the spines are comparatively somewhat shorter, less sharp and less strongly curved upward. At its base the rostrum carries at either side a sharp spine that is larger than those of the lateral margins and directed obliquely forward, from which a sharp carina is continued on to the gastric region and this carina carries a second spine somewhat smaller, placed a little nearer to the orbital margin than to the cervical groove, which groove is quite conspicuous. The surface of the rostrum is deeply furrowed and this furrow bifurcates at the level of the posterior pair of rostral spines; between these two furrows arises the rather sharp median carina of the gastric region, which posteriorly becomes more obtuse and ends not far from the cervical groove. At some distance behind the level of the orbital margin the median carina carries a sharp tooth, directed obliquely forward, this distance measures about $^1/_3$ the length of the rostrum; behind this tooth a much smaller similar tooth is placed and contiguous to the latter a somewhat larger obtuse tubercle that is, however, smaller than the anterior tooth. From the posterior extremity of the median carina the surface of the carapace slopes obliquely down to its posterior extremity. At either side of the median carina is a straight row of sharp spines, parallel with the median carina, the left row consisting of two, the right of four spines; the distance (0,9 mm.) between the two rows from one another is almost equal to their length. The foremost pair of these submedian spines or teeth is situated immediately behind the middle of the distance between the two spines of the outer or lateral carinae and these teeth of the anterior pair, about of the same size as the anterior tooth of the median carina, are twice as large as the submedian tooth resp. teeth behind them, that are equal. From the posterior tooth of the submedian rows a sharp ridge runs backward, slightly converging towards the median carina and reaching about as far. In front of the basal spine and of the

posterior spine of the lateral margins of the rostrum a tuft of setae is implanted on them, small tufts of setae occur also on the gastric region and short setae are observed near the cervical groove.

The abdominal terga are rounded above, not carinate, the 6th tergum is a little more arcuate longitudinally than that of *Cal. felix* and the pleura of the 1st, 3rd, 4th and 5th somites are less angular, less sharp posteriorly. The telson (Fig. 22*b*), 2,4 mm. long and 1,92 mm. broad in the middle, resembles that of *Cal. Sibogae*, being rounded posteriorly and presenting anteriorly four spinules on its upper surface, two at either side of the middle line, the two spinules of the posterior pair twice as far distant from one another than those of the anterior. The lateral margins, however, which in *Cal. Sibogae* are armed only with one movable spine besides the two near the posterior border, carry in *Cal. euophthalma* a fourth also movable, not far from the two last named; the lateral edge, entire in *Cal. Sibogae*, is notched at some distance before and at some distance behind the anterior spine, thus forming at each notch a very small sharp tooth. The outer edge of the inner uropod (Fig. 22*c*) is not entire, but serrate, being armed with 4 or 5 sharp, somewhat unequal teeth along its whole length, but it ends, like in *Cal. Sibogae*, in a somewhat stronger tooth or spine at the posterior extremity; the midrib, that runs just in the middle of the plate, is not smooth, but armed with 4 or 5 spines along its whole length, besides that at the distal extremity. The outer uropod also differs. Its anterior edge is serrate along its distal half by 4 or 5 small teeth; a much larger spine occurs near the distal extremity at the outer end of the transverse suture that is armed with an uninterrupted row of 8 or 9 acute teeth. As regards the two ribs on the outer portion of this plate, it may be remarked that the outer one, which is almost twice as long as the inner, though not reaching to the suture, is covered with 9 or 10 very small spinules, arranged irregularly.

The eyepeduncles, 0,82 mm. long, extend almost to the middle of the rostrum; the dark-brown pigmented eye with well developed facets occupies half the length of the whole peduncle.

The inner antennae are 11 mm. long, in proportion to the length of the carapace just as long as in *Cal. Sibogae*. The peduncle is 1,9 mm. long, the 1st article is 1,06 mm. long and the expanded basal portion occupies almost two-thirds the whole length of it, it appears almost 3-times as long as the 2nd, that has a length of 0,38 mm. The 3rd article is 0,44 mm. long.

The outer antennae, 17 mm. long, resemble those of *Cal. Sibogae*, but the stylocerite is a little shorter, reaching not yet to the middle of the penultimate joint, that is just 1 mm. long; the scaphocerite, a slender pointed spine, extends as far forward along the 4th joint as in *Cal. Sibogae*. The spine on the middle of the anterior border of the lower surface of the 1st joint is only 0,12 mm. long, the straight spine at the distal end of the inner border of the 3rd joint measures 0,18 mm.

The external maxillipeds (Fig. 22*d*) differ also. Like in *Cal. Sibogae* the two first joints are armed with a spine at their antero-internal angle; the ischium, which is 1,3 mm. long and 0,42 mm. broad in the middle, appears a little broader than in that species and is armed just behind the middle of its inner margin with 2 small spines, of which the anterior is a little longer than the other. The ischium is armed on the middle of its inner surface with a prominent,

denticulated crest, as in *Cal. Sibogae*; this crest that runs somewhat obliquely to the distal end of the inner border, projects for a short distance beyond the articulation with the merus and is armed with 15 strong teeth of which the last 5 or 6 gradually decrease in size. The merus, that is 1,4 mm. long and 0,48—0,5 mm. broad in the middle, is also somewhat broader in proportion to its length than in *Cal. Sibogae*; it carries a strong spine, 0,32 mm. long, at the distal end of its slightly arcuate, inner border, a somewhat shorter one just in the middle and a very small one behind the latter. The three last joints are respectively 1,1 mm., 1 mm., and 0,7 mm. long; the carpus that is 0,45 mm. broad, somewhat broader than in *Cal. Sibogae*, bears a very small tooth at the distal end of its inner border. All the joints are fringed with hairs along their inner margins. The slender exopod reaches to the middle of the carpus. The stalk, 1,2 mm. long and 6-times as long as broad, tapers slightly to the distal end, the stalk being 0,17 mm. broad at the latter and 0,21 mm. at its base; the flagellum is 1,8 mm. long, much thinner than in *Cal. Sibogae* and nearly all the joints are longer than broad.

The anterior legs are of a stout shape and somewhat unequal, the left (Fig. 22*e*) being slightly larger than the other. The left leg is about 15 mm. long, almost twice as long as the carapace (rostrum included) and the merus reaches as far forward as the rostrum. The lower border of the ischium (Fig. 22*f*) bears 3 or 4 very small, obtuse teeth and a strong spine at the distal end. The merus that appears slightly broader in proportion to its length than in *Cal. Sibogae*, has a serrate lower border; the teeth, 8 or 9 in number, along the whole length of the border grow slightly larger distally and are barely sharp, excepting the tooth at the distal end that is sharp and larger than the preceding. The sharp, arcuate, upper border is nearly unarmed, for one observes only 2 or 3 minute teeth near the distal end; the upper border is hairy near the edge and there is a tuft of setae at the distal extremity. The carpus, 2,25 mm. long and 2,33 mm. high at the articulation with the chela, presents only a minute tooth at the distal end of its upper border; the somewhat flattened, lower surface is unarmed, though separated by a distinct ridge from the outer side. The left chela is 6,67 mm. long, the palm 3,33 mm. long and 3,2 mm. high at the articulation with the fingers; near the articulation with the carpus the palm appears barely higher than it. The upper border of the palm bears a small tooth about in the middle and a larger sharp tooth at the distal end; its smooth outer surface, slightly convex transversely and also somewhat longitudinally, carries a small acute tooth at the distal end, immediately below the articulation of the dactylus and a prominent ridge, beset with tufts of setae, runs along the lower border from the proximal extremity of the palm almost to the tip of the fixed finger. The inner surface of the palm is somewhat convexer, both transversely and longitudinally, than the outer and also smooth and unarmed. The somewhat compressed fingers are just as long as the palm. The pointed tips cross one another on closure; the cutting-edge of the fixed finger carries two elongate, though low and obtuse teeth, the dactylus, however, appears but slightly uneven on its proximal half. The upper border of the dactylus is longitudinally ridged from the base to the tip.

The right chela is 6,5 mm. long and the fingers that are 3,5 mm. long, appear distinctly a little longer than the palm; the sharp cutting-edge of the dactylus agrees with that of the other finger, the fixed finger, however, carries several very small and unequal teeth, one of which in the middle of the prehensile edge is rather sharp and elongate. In its other characters

this chela agrees with the other. Carpus, palm and fingers are hairy on their borders, but glabrous on their outer and inner surface.

Coxa, basis and ischium of 2nd legs unarmed. Merus 4,3 mm. long, 7-times as long as broad, with 2 small teeth in the middle of the lower border, the tips of which are 0,72 mm. distant from one another and of which the posterior is a little smaller than the anterior; carpus (Fig. 22*g*) 2,4 mm. long, 0,48 mm. broad at the distal extremity, 0,58 mm. in the middle, 5-times as long as broad and about half as long as the merus; chela 2,7 mm., palm 1,66 mm. long, 0,48 mm. broad at the proximal, 0,7 mm. at the distal end, fingers 1 mm. long, slightly more than half as long as the palm; the fixed finger carries along the whole length of the cutting-edge 20 minute teeth that slightly increase in size distally, similar teeth exist also along the distal half of the dactylus. Merus setose along its lower border, carpus and chela on both.

The following legs agree also with those of *Cal. Sibogae*. The meri of the 4th pair reach until the distal 3rd part of those of the 3rd, those of the 3rd have 2 or 3 small sharp teeth on their lower border, but the meri of the 4th are unarmed.

According to Alcock (A descript. Catalogue of the Indian Deep-Sea Crustacea Decapoda Macrura and Anomala, in the Indian Museum, Calcutta, 1901, p. 188) the 1st pair of abdominal appendages should in *Calocaris* be slender and uniramous in both sexes. In *Cal. euophthalma*, however, the 1st abdominal somite of the male carries no appendages at all. The pleopods of the 4 following somites are slender and biramous. Those of the 2nd carry an appendix masculina, furnished with long hairs, and a glabrous stylamblys, the 3 following pleopods only a styliform, glabrous stylamblys. It is much to be regretted that both of *Cal. Sibogae* and of *Cal. euophthalma* only one single specimen has been collected, for, notwithstanding the many differences, the possibility of the former being the female of the latter must in my opinion be admitted, in which case the name of *euophthalma* should have the priority. The different shape of the chelae of the anterior legs may perhaps be a sexual character, while the different shape and characters of the outer footjaws, the different arrangement and size of the spines on the rostrum and the gastric region, on the telson and on the uropods are perhaps owing to and may perhaps be explained by the different size and age of both specimens.

In the only type specimen of *Cal. felix* (Alcock & Anders.) from the Arabian Sea, which, according to Prof. Alcock, should be a female, the fingers of the chelae of the anterior legs are as long as the palm, the dentition of the immobile finger is, however, quite another than in the male of *Cal. euophthalma* or than in the female of *Cal. Sibogae*; apart from these characters *Cal. felix* may at once be distinguished from the two others by the short fixed eyestalks and by the shorter antennal thorns.

Cal. longispinis (McArdle) from the Arabian Sea is also an allied species, but differs both from *Cal. Sibogae* and *Cal. euophthalma* by the fingers of the 2nd legs being considerably longer than the palm (Illustrations of the Zool. of the Investigator, Plate LVII, 1902, fig. 2).

INDEX.

Note. — Synonyms are printed in Italics. The more important pages are indicated by heavier type.

aberrans (Calocaris (Calocaris)) 2. 7. 115. **116.**
acanthus (Axius (Neaxius)) 3. 10—12. **14.** 74.
acanthus var. mauritiana (Axius (Neaxius)) 3. 10. **14.**
acutifrons (Axius) 37.
acutifrons (Axius (Eiconaxius)) 4. 8. 10. **15.** 16. **37.** 39—42. 47.
acutifrons (Eiconaxius) 37.
aethiopica (Axiopsis (Paraxiopsis)) 6. 67. 68. **72.**
affinis (Axiopsis) 72.
affinis (Axius) 72. 74. 78.
Agassizii (Axius (Eiconaxius)) 4. 10. **17.**
Alcocki (Calocaris (Calocaris)) 7. 115. **116.**
altus (Axius (Paraxius)) 5. 10. 11. **18.**
andamanensis (Axius (Eiconaxius)) 4. 10. **16.**
andamanensis (Iconaxiopsis) 9.
Anophthalmaxius 1. 2. **5.** 60.
Aphrocallistes 11.
armatus (Axius (Axius)) 3. 9. **11.**
asper (Axius (Eiconaxius)) 4. 10. **14.** 34.
australiensis (Axiopsis (Axiopsis)) 5. 67. **69.**
Axiidae I. **1.** 3.
Axiopsis 1. 2. **5.** 62. **66.**
Axius 1. **3.** 8.

Barnardi (Calocaris (Calocaris)) 7. 115. **116.**
biserrata (Axiopsis (Paraxiopsis)) 7. 67. 68. **71.**
bisquamosa (Axiopsis (Paraxiopsis)) 7. 67. 68. **72.** 109.
Borradailei (Axius (Eiconaxius)) 4. 10. **17.**
Brockii (Axiopsis (Paraxiopsis)) 7. 19. 67. 68. **71.** 101. 110—112.
Brocki (Axius) 101.

Calastacus 1. 2. **8.** 114. 115. **116.**
Callianassa 84.
Calocarides 1. 2. **6.** 67. **71.**
Calocaris 1. 2. **7.** 66. **114.** 115.
caribbaeus (Axius (Eiconaxius)) 4. 10. 11. **16.**
clypeata (Axiopsis (Axiopsis)) 5. 67. **70.**
communis (Axius (Eiconaxius)) 4. 10. **17.**
consobrina (Axiopsis (Axiopsis)) 5. 67. **69.** 80.
consobrinus (Axius (Eiconaxius)) 4. 10. **16.** 36. 37. **40.**
consobrinus (Iconaxius (Iconaxiopsis)) 40.
coronata (Axiopsis (Calocarides)) 6. 67. **71.**
crassipes (Axiopsis (Calocarides)) 6. 67. **71.**
crista-galli (Axius) 31.
crista-galli (Axius (Eiconaxius)) 4. 10. **14.** **32.**
crista-galli var. antillensis (Axius (Eiconaxius)) 4. 10. 15. **33.**
crista-galli var. indica (Axius (Eiconaxius)) 4. 10. **15.** **31.**
crista-galli var. *indica (Iconaxius)* 31.
cynoglossus (Glyptocephalus) 3.

defensa (Axiopsis (Paraxiopsis)) 7. 67. 68. **71.**

eccoptodactylus (Anophthalmaxius) 5. **61.**
Eiconaxius 1. **4.** 8. 10.
euophthalma (Calocaris (Calastacus)) 8. 115. **118.** **122.**
euophthalmus (Calastacus) 122.
euryrhynchus (Axius (Neaxius)) 3. 9. **12.** **25.**
Evaxius 49.

Farrea 11.
farreae (Axius (Eiconaxius)) 4. 9—11. **16.** 38. 40. 42. **48.**
felix (Calocaris (Calastacus)) I. 8. 115. **117.** 118—121. 123. 125.

Glyptocephalus 3.
glyptocercus (Axius (Neaxius)) 4. 9. 11—**13.**
Gundlachi (Axius (Neaxius)) 4. 9. **12.** **31.**
Gundlachi var. orientalis (Axius (Neaxius)) 4. 9. **12.** **31.**

Habereri (Axiopsis (Axiopsis)) 2. 5. 67. **70.** 98.
Hexactinellidae 11.

Iconaxiopsis 1. **4.** 8. 10.
inaequalis (Axiopsis (Axiopsis)) 6. 67. **69.** 70.
Investigatoris (Calocaris (Calastacus)) 2. 8. 115—**117.** 120.

japonicus (Oxyrhynchaxius) **2.** 7.

kermadecensis (Axius (Eiconaxius)) 4. 10. **15.**
kermadeci (Axius (Eiconaxius)) 4. 10. **16.** 46—**48.**

laccadivensis (Axius (Eiconaxius)). 4. 10. 11. **16.**
laccadivensis (Iconaxiopsis) 9.
laevis (Axius (Neaxius)) 4. 9. 11. **13.**
longipes (Axiopsis (Axiopsis)) 6. 67. **70.**
longispina (Axius) **54.**
longispina (Meticonaxius) 5.
longispinis (Calocaris (Calastacus)) 8. 115. **118.** 125.

Macandreae (Calocaris (Calocaris)) 7. 114—**116.**
mediterranea (Axiopsis (Axiopsis)) 6. 67. 68. **70.**
Metaxius 1. **2.** 8.
Meticonaxius 1. 2. **5.** 53.
microps (Metaxius) 8.
monodon (Meticonaxius) 5. **54.** 84.

Neaxius 1. **3.** 8.
nodulosus (Axius) 5. 9. **18.**
novae-zealandiae (Axius (Axius)) 3. 9. **12.**

odontorhynchus (Axius (Axius)) 3. 9. **12.** 18.
odontorhynchus (Axius (Neaxius?)) 18.
Oxyrhynchaxius 1. **2.** **7.** 66.

pailoloensis (Axiopsis (Axiopsis)) I. 6. 67. **69.** **89.**
pailoloensis (Axius) 89.
Paraxiopsis 1. 2. **6.** 67. **71.** **101.**
Paraxius 1. **5.** 8. 10. **18.** 92.
parvus (Axius (Eiconaxius)) 4. 10. **16.** 33. 38—40. **42.** 47. 48.
parvus (Eiconaxius) 42.
Picteti (Axiopsis (Axiopsis)) 6. 67. 68. **70.** **92.**
Picteti var. spinimana (Axiopsis (Axiopsis)) 6. 67. 68. **70.** **96.**
Picteti (Paraxius) 92.
pitatucensis (Axiopsis (Axiopsis)) 6. 67. **69.**
plectrorhynchus (Axius (Neaxius)) 4. 9—**13.**
princeps (Axiopsis (Axiopsis)) 6. 67. **69.**

quinqueseriata (Calocaris (Calastacus)) 2. 8. 115. **118.**

rotundifrons (Axius (Eiconaxius)) 4. 10. **17.**
rudis (Axiopsis (Axiopsis)) 6. 67. **70.**
rudis (Axius) 90.

Scytoleptus 1. **5.** **49.**
serratifrons (Axia) 72.
serratifrons (Axiopsis (Axiopsis)) 6. 67. **68.** **72.** 80—82. 84.
serratifrons (Axius) 72.
serratus (Axius (Axius)) 3. 9. **11.**
serripes (Scytoleptus) 5. **49.**
Sibogae (Axius (Eiconaxius)) I. 4. 10. **15.** **34.**
Sibogae (Calocaris (Calastacus)) I. 8. 115. **118.** 122—125.
spiniger (Axius (Eiconaxius)) 4. 10. **15.** 47.
spiniger (Iconaxiopsis) 9.
spinipes (Axiopsis) 72.
spinipes (Axius) 72. 74. 76. 78. 79. 81—83.
spinosissima (Axiopsis (Axiopsis)). I. 6. 67. 68. **70.** **98.**
spinosissimus (Axius) 98.
spinulicauda (Axiopsis (Axiopsis)) 6. 67. **69.**
stilirostris (Calocaris (Calastacus)) 8. 115. **117.**
stirhynchus (Axius (Axius)) 3. 9—**11.** 58.

tenuicornis (Axiopsis (Axiopsis)) 6. 67—**69.** 83. **84.**
tricarinatus (Evaxius) **52.**
tricarinatus (Scytoleptus) 5. 49. **52.**
tridens (Axius (Paraxius)) 5. 10. 11. **18.**

Vivesi (Axius (Neaxius)) 4. 10—12. **14.**

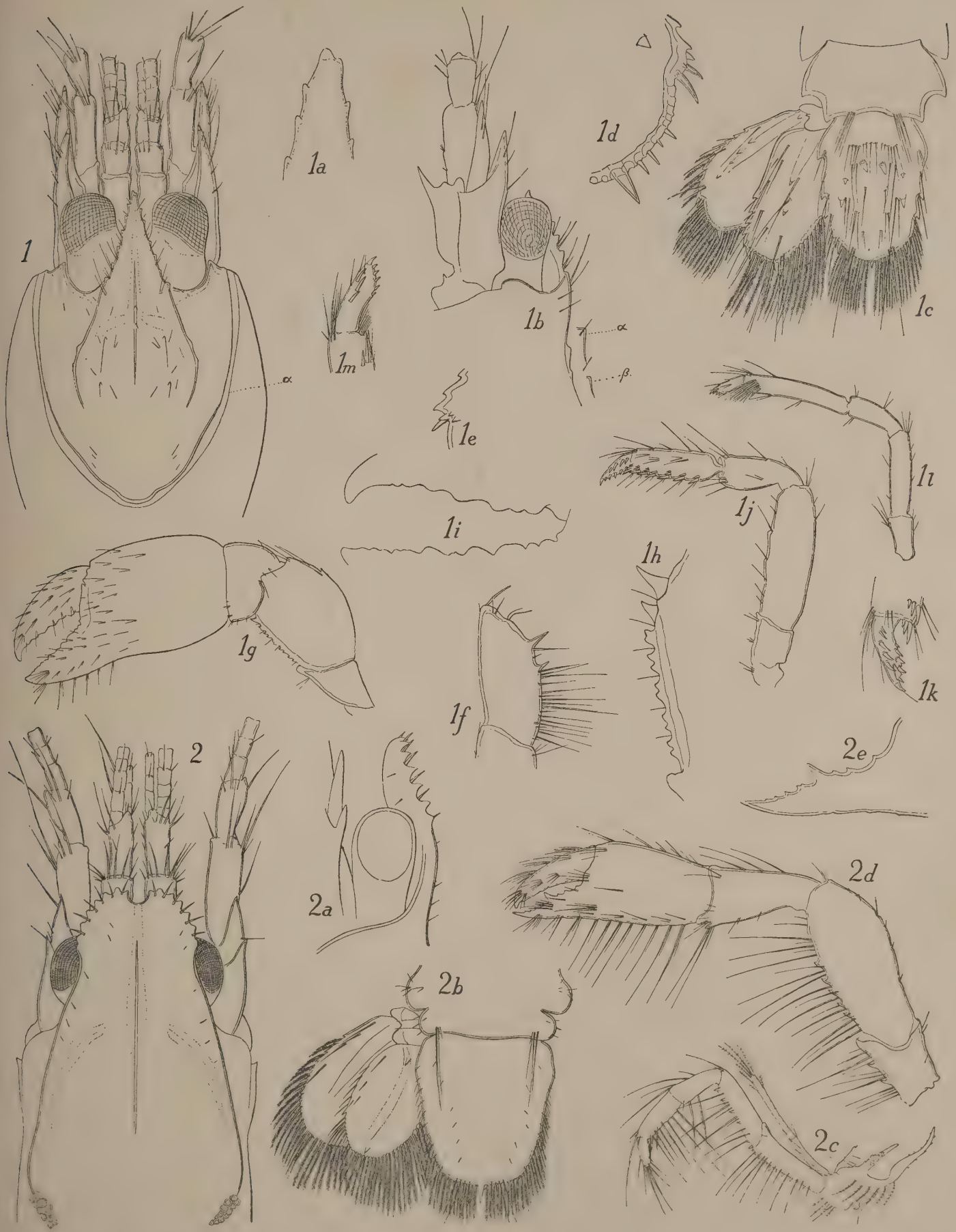
Weberi (Axius (Eiconaxius)) 5. 10. 11. **17.** 33. 38. 39. 42—**44.**
Weberi (Iconaxius) 44.

EXPLANATION OF THE PLATES.

PLATE I.

Fig. 1—1*m*. *Axius (? Axius) odontorhynchus* de Man. Excepting Fig. 1*e* all the figures are taken from the typical male captured at Stat. 260. 1 anterior part of carapace with rostrum, eyepeduncles etc., × 37½, *α* cervical groove; 1*a* anterior part of rostrum, × 100; 1*b* lateral view of the rostrum, left eyepeduncle and left antennal peduncle, *α* and *β* the two teeth in which the two parts of the left submedian ridge on the anterior part of the gastric region terminate, × 37½; 1*c* 6th abdominal somite, telson and left uropods, × 25; 1*d* apical portion of the right outer uropod, × 75; 1*e* antero-external angle of the left outer uropod of the female from Stat. 294, × 50; 1*f* merus of right maxilliped of 3rd pair, × 50; 1*g* left cheliped of 1st pair, outer side, × 19; 1*h* lower border of the merus of this cheliped, × 50; 1*i* cutting-edges of the two fingers of this cheliped, × 50; 1*j* left leg of 3rd pair, outer side, × 25; 1*k* dactylus of this leg, × 50; 1*l* left leg of 5th pair, outer side, × 25; 1*m* dactylus of this leg, looked at from the inner side, × 50.

Fig. 2—2*e*. *Axius (Neaxius) eurÿrhynchus* de Man. All the figures are taken from the larger described female, excepting the figures 2*j* and 2*k* that were taken from the other specimen. 2 anterior part of carapace with the eyes etc., × 37½; 2*a* lateral view of rostrum, eye etc., × 50; 2*b* telson with left uropods, × 25; 2*c* external maxilliped, × 25; 2*d* left cheliped of 1st pair, outer side, × 25; 2*e* distal half of the immobile finger, × 50.



J. G. DE MAN, del.

PLATE II.

Fig. 2*f*—2*k*. *Axius (Neaxius) euryrhynchus* de Man. 2*f* leg of 4th pair, × 25; 2*g* leg of 5th pair, × 25; 2*h* dactylus and propodal process of this leg, × 75; 2*i* propodal process, × 160; 2*j* dactylus and propodal process of the 5th leg of the other specimen, × 75; 2*k* propodal process of this leg, × 160.

Fig. 3—3*b*. *Axius (Eiconaxius) crista-galli* Faxon var. *indica* de Man. Female with eggs from Stat. 267. 3 anterior part of carapace with rostrum and eyes, × 25; 3*a* caudal fan, × 12½; 3*b* leg of 2nd pair, × 10.

Fig. 4—4*l*. *Axius (Eiconaxius) Sibogae* de Man. All the figures are taken from the male, the type, excepting Fig. 4*b*. 4 anterior part of carapace, eyes and peduncles of the inner and outer antennae, × 25; 4*a* lateral view of rostrum, eyestalk and stylocerite, × 37½; 4*b* lateral view of the anterior part of the gastric region of the larger specimen, × 50; 4*c* sixth abdominal somite, telson and right uropods, × 20; 4*d* apical lobule of inner uropod, × 37½; 4*e* 2nd maxilliped, × 25; 4*f* 3rd maxilliped, × 25; 4*g* distal half of merus, 4*h* proximal part of ischium of this footjaw, × 50; 4*i* small cheliped of the male, outer side, × 9; 4*j* lower margin of ischium and merus of this leg, × 20; 4*k* leg of 2nd pair, × 20; 4*l* 2nd pleopod of the male, × 37½.

J. G. DE MAN, del.

PLATE III.

Fig. 5—5*e*. *Axius (Eiconaxius) acutifrons* (Bate). Male from Stat. 266. 5 rostrum and eyes, × 25; 5*a* telson, × 12½; 5*b* left larger cheliped of 1st pair, outer side, × 6; 5*c* right smaller cheliped of 1st pair, outer side, × 6; 5*d* lobe at the base of the immobile finger, × 25; 5*e* leg of 2nd pair, × 12½.

Fig. 6—6*d*. *Axius (Eiconaxius) consobrinus* (de Man). 6 rostrum and anterior part of carapace with the eyes of the female from Stat. 280, × 25; 6*a* rostrum of the male, × 25; 6*b* right larger, 6*d* left smaller cheliped of the male, outer side, × 6; 6*c* lower margin of ischium and merus of the right larger cheliped of the male, × 12½.

Fig. 7—7*f*. *Axius (Eiconaxius) parvus* (Bate). 7 rostrum and anterior part of carapace with the eyes of the male from Stat. 262, × 25; 7*a* telson of this male, × 12½; 7*b* posterior margin of telson, × 37½; 7*c* right larger cheliped, × 6; 7*d* lower margin of the merus of this leg, × 12½; 7*e* proximal part of the cutting-edge of the immobile finger, × 12½; 7*f* leg of 2nd pair, × 12½.

Fig. 8—8*a*. *Axius (Eiconaxius) Weberi* (de Man). All the figures are taken from specimens collected at Stat. 266. 8 rostrum and anterior part of carapace of the larger male, × 25; 8*a* the same looked at lateral, × 25.

J. G. DE MAN, del.

PLATE IV.

Fig. 8*b*—8*o*. *Axius (Eiconaxius) Weberi* (de Man). 8*b* rostrum and eyes of an egg-bearing female, × 25; 8*c* telson and right uropods of the larger male, × 16½; 8*d* telson of the larger egg-bearing female, × 16½; 8*e* larger right cheliped of the larger male, outer side, × 6; 8*f* lower margin of ischium and merus of this cheliped, × 25; 8*g* cutting-edges of the chela of this cheliped, × 25; 8*h* smaller left cheliped of the larger male, × 6; 8*i* lower margin of ischium and merus of this cheliped, × 25; 8*j* bicuspid, though obtuse lobe at the base of the immobile finger of this cheliped, × 25; 8*k* biscuspid, acute tooth at the base of the immobile finger of the smaller chela of an ova-bearing female, × 25; 8*l* cutting-edge of the immobile finger and acute tooth at the base of the smaller right chela of the smaller male, × 25; 8*m* leg of 2nd pair of the larger male, × 12½; 8*n* pleopod of 2nd somite of the larger male, × 25; 8*o* stylamblys and appendix masculina of this pleopod, × 50.

Fig. 9—9*h*. *Scytoleptus serripes* Gerst. 9 left smaller leg of 1st pair of the female, long 46 mm., from Stat. 58, outer side, × 4½; 9*a* left pleopod of 1st somite of the male from Stat. 58, × 15; 9*b* distal extremity of this pleopod, × 50 (the basal part of the setae is only drawn); 9*c* left pleopod of 1st somite of the female, long 46 mm., from Stat. 58, × 15; 9*d* distal extremity of this pleopod × 50; 9*e* left pleopod of 2nd somite of the male from Stat. 58, × 15; 9*f* stylamblys of this pleopod, × 50; 9*g* left pleopod of 2nd somite of the female, long 46 mm., × 10 (the feathered setae are omitted); 9*h* stylamblys of this pleopod, × 25 (In the other figures the setae are drawn simple, without feathers).

Fig. 10. *Meticonaxius monodon* de Man. 10 anterior part of carapace with rostrum, antennal and antennular peduncles and eyes, × 25.

J. G. DE MAN, del.

PLATE V.

Fig. 10*a*—10*t*. *Meticonaxius monodon* de Man. 10*a* anterior part of rostrum, × 100; 10*b* caudal fan, × 12½; 10*c* 2nd maxilliped, × 25; 10*d* terminal joint of this maxilliped, × 100; 10*e* 3rd maxilliped, × 25; 10*f* right leg of 1st pair, × 10½; 10*g* tooth on the lower margin of the merus, × 37½; 10*h* proximal part of the cutting-edge of the immobile finger, × 37½; 10*i* carpus and chela of the right leg of 2nd pair, × 10½; 10*j* cutting-edges of the fingers of this chela, × 37½; 10*k* leg of 3rd pair, × 12½; 10*l* propodus and dactylus of the leg of 4th pair, × 12½; 10*m* the 2nd denticulate bristle on the propodus of this leg, × 75; 10*n* one of the other denticulate bristles, × 75; 10*o* leg of 5th pair, × 25; 10*p* one of the feathered setae on the distal half of the lower margin of the propodus of this leg, × 75; 10*q* a portion of this seta more magnified, × 240; 10*r* pleopod of 3rd somite, × 12½; 10*s* stylamblys of this pleopod, × 37½; 10*t* cincinnuli of this stylamblys, × 240.

Fig. 11—11*d*. *Anophthalmaxius eccoptodactylus* de Man. 11 anterior part of carapace with the left antennular and the two antennal peduncles, × 25; 11*a* telson and left uropods, × 16½; 11*b* the three teeth on the left margin of the telson, × 75; 11*c* 2nd maxilliped, × 25; 11*d* 3rd maxilliped, × 16½.

10b
10d
10c
10a
10g
10o
10q
10p
10e
10h
10j
10f
10m
10n
10l
10r
10s
10t
10i
11c
10k
11a
11d
11
11b

J. G. DE MAN, del.

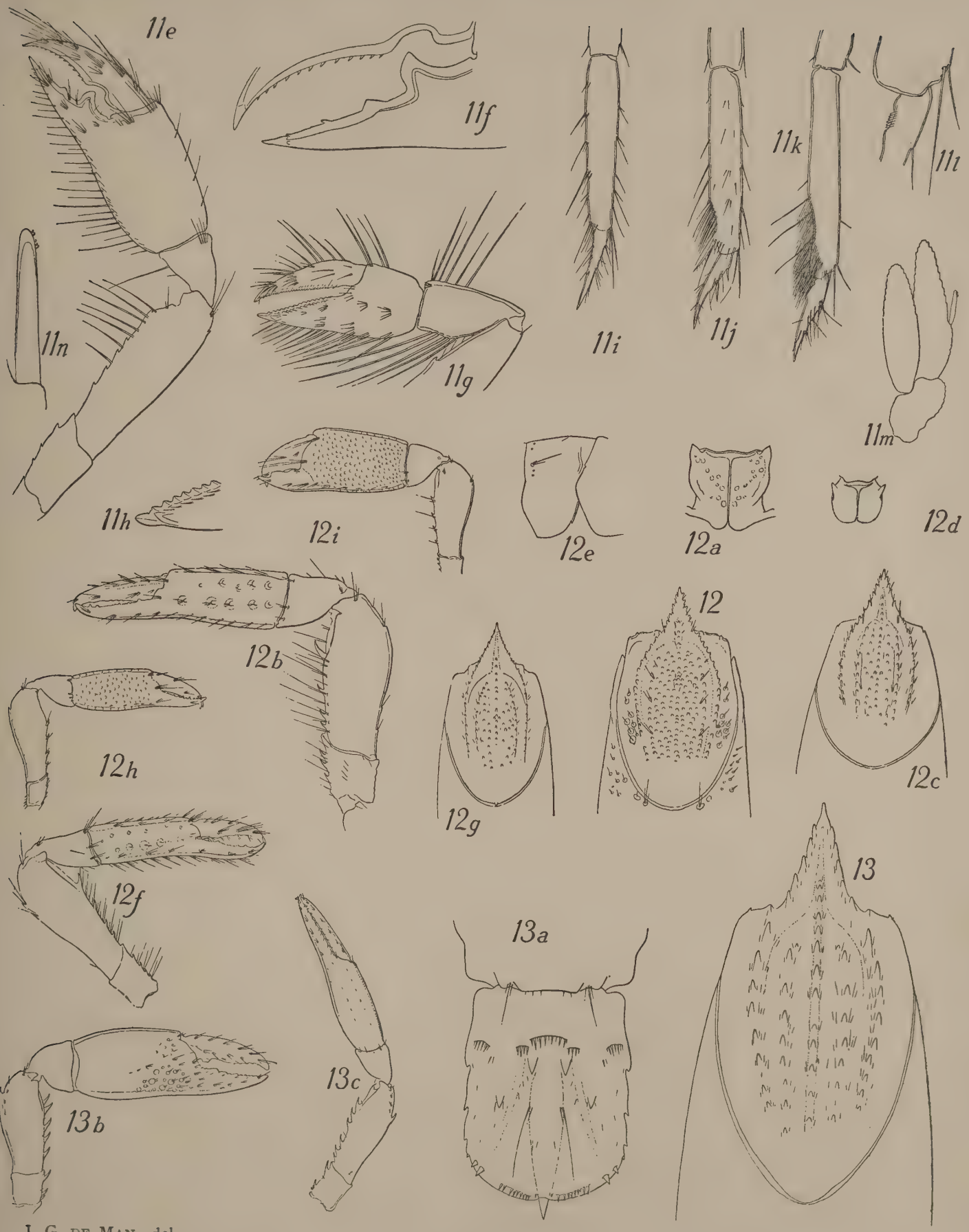
PLATE VI.

Fig. 11*e*—11*n*. *Anophthalmaxius eccoptodactylus* de Man. 11*e* left leg of 1st pair, × 16½; 11*f* terminal part of the fingers of this leg, × 37½ (setae not drawn); 11*g* left leg of 2nd pair, × 25; 11*h* distal part of the immobile finger of this leg, × 75; 11*i* propodus and dactylus of the right leg of 3rd pair, × 25; 11*j* propodus and dactylus of the right leg of 4th pair, × 25; 11*k* propodus and dactylus of the right leg of 5th pair, × 25; 11*l* terminal part of propodus and proximal part of the dactylus of this leg, × 75; 11*m* pleopod of 2nd somite, × 16½; 11*n* stylamblys of this pleopod, × 75.

(In Figure 11 the rostrum, the median and the lateral carinae are drawn, as they did appear to the author; the rostrum was so badly damaged, that the true shape and characters did remain uncertain; the antepenultimate joint of the antennal peduncle reaches on the left side a little more forward than on the right, probably owing to the damage.)

Fig. 12—12*i*. *Axiopsis (Axiopsis) serratifrons* (A. M.-Edw.). 12 Rostrum and gastric region of the adult male from Kur-island, × 3; 12*a* sternal plaque of this male, × 4½; 12*b* left smaller cheliped of this male, outer side, × 3; 12*c* rostrum and gastric region of the young male from Stat. 142, × 4½; 12*d* sternal plaque of this specimen, × 4½; 12*e* pleurum of the 4th and part of 3th somite on the right side of this male, × 4½; 12*f* smaller cheliped of the young male from Stat. 225, outer side, × 4½; 12*g* rostrum and gastric region of the egg-bearing female from Stat. 301, × 6; 12*h*, 12*i* smaller right and larger left cheliped of this female from Stat. 301, × 4½.

Fig. 13—13*c*. *Axiopsis (Axiopsis) consobrina* de Man. 13 anterior part of carapace and rostrum of the male from Stat. 305, × 12½; 13*a* telson of this specimen, × 12½; 13*b*, 13*c* right larger and left smaller leg of 1st pair of this male, × 4½.


11e
11f
11n
11g
11i
11j
11k
11l
11m
11h
12i
12e
12a
12d
12b
12
12h
12g
12c
12f
13
13a
13b
13c

J. G. DE MAN, del.

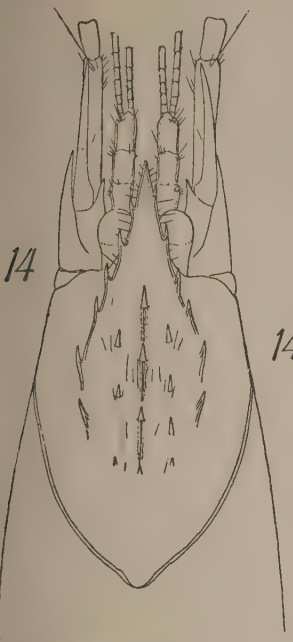
PLATE VII.

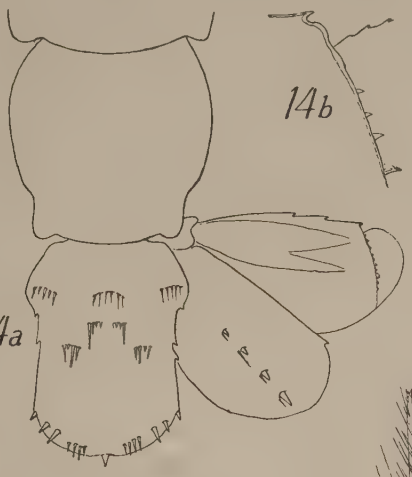
Fig. 14—14*l*. *Axiopsis (Axiopsis) tenuicornis* de Man. 14 anterior part of carapace with rostrum, eyestalks etc., × 12½; 14*a* 6th abdominal somite, telson and right uropods, × 12½ (the feathered marginal setae were lost and rubbed off, when the specimen was figured); 14*b* notch on the outer uropod and anterior part of the transverse suture, × 100; 14*c* merus of third maxilliped, outer side, × 25; 14*d* right leg of 1st pair, outer side, × 8½; 14*e* fingers of this leg, × 16½; 14*f* left leg of 1st pair, outer side, × 8½; 14*g* fingers of this leg, × 16½; 14*h* distal part of the immobile finger of this leg, with the 5 conical movable teeth on the cutting-edge, × 50; 14*i* left leg of 2nd pair, outer side, × 12½; 14*j* left leg of 3rd pair, outer side, × 12½; 14*k* right pleopod of 2nd somite, × 25; 14*l* distal extremity of the stylamblys with the cincinnuli, × 240.

Fig. 15—15*b*. *Axiopsis (Axiopsis) pailoloensis* (Rathb.). 15 Rostrum, anterior part of carapace etc. of the female from Stat. 204, × 25; 15*a* telson and right uropods of this female, × 25; 15*b* 3rd maxilliped of this female, × 25.

Fig. 16—16*a*. *Axiopsis (Axiopsis) Picteti* (Zehntner). 16 anterior part of carapace and eyestalks of the male, long 22,5 mm. from Stat. 209, × 12½; 16*a* lateral view of the same, × 20; 16*b* caudal fan of this male, × 6¼.

Fig. 17—17*a*. *Axiopsis (Axiopsis) Picteti* (Zehntner) var. *spinimana* de Man. 17 right larger, 17*a* left smaller cheliped of the egg-bearing female from Stat. 209, × 4.


14


14a

14b

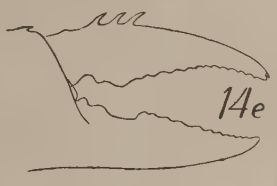
14c

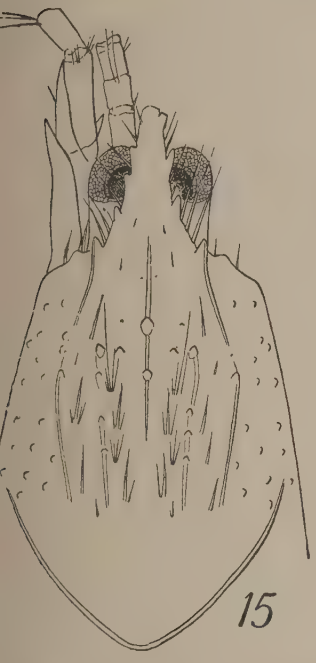
14d

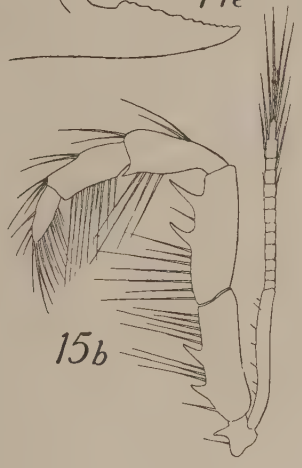
14f

14h

14g


14e


15


15b

14i

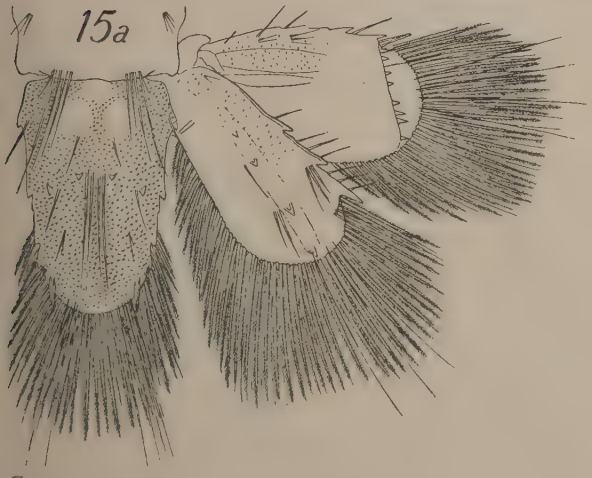
14j

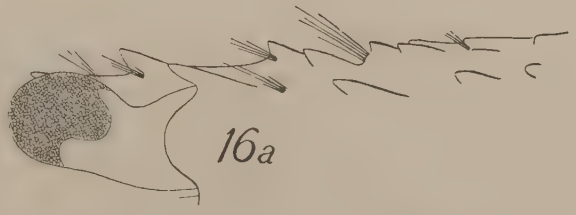
16

16b

14k

14l


15a


16a

17

17a

G. DE MAN, del.

PLATE VIII.

Fig. 18—18*g*. *Axiopsis (Axiopsis) spinosissima* (Rathb.). All the figures are taken from the specimen captured at Stat. 204. 18 Anterior part of carapace, rostrum etc., × 25; 18*a* telson and left uropods, × 15; 18*b* left 3rd maxilliped, × 15; 18*c* left leg of the 2nd pair, × 15; 18*d* propodus and dactylus of 4th leg, × 15; 18*e* dactylus of this leg, × 25; 18*f* propodus and dactylus of 5th leg, × 15; 18*g* dactylus of this leg, × 25.

Fig. 19—19*j*. *Axiopsis (Paraxiopsis) Brocki* (de Man). 19 gastric region, rostrum etc. of the egg-bearing female from Stat. 79*b*, × 12½; 19*a* rostrum of this specimen, × 25; 19*b* gastric region and rostrum of the full-grown female with eggs from Stat. 131, × 12½; 19*c* abnormal tip of the rostrum of this specimen, × 50; 19*d* anterior part of carapace and eyes of the young female from Stat. 154, × 12½; 19*e* abdomen of this female, × 5; 19*f* telson and right uropods of this female, × 12½; 19*g* left antennal peduncle, anterior part of carapace and eye of this female, × 16½; 19*h* movable scaphocerite and stylocerite of the same specimen, × 50; 19*i* pleopod of 2nd somite of the young male from Stat. 51, × 25; 19*j* appendix masculina of this pleopod, × 50.

Fig. 20—20*c*. *Axiopsis (Paraxiopsis) bisquamosa* de Man. 20 gastric region, rostrum etc., × 25; 20*a* lateral view of rostrum, left eyepeduncle and left antennal peduncle, × 37½; 20*b* lateral view of the upper border of the rostrum, × 75; 20*c* telson and right uropods, × 25.

18
18a
18b
18c
18d
18e
18f
18g
19
19a
19b
19c
19d
19e
19f
19g
19h
19i
19j
20
20a
20b
20c

J. G. DE MAN, del.

PLATE IX.

Fig. 20*d*—20*n*. *Axiopsis (Paraxiopsis) bisquamosa* de Man. 20*d* 3rd maxilliped, × 27½; 20*e* inner border of ischium of this maxilliped, × 55½; 20*f* right cheliped, outer side, × 14; 20*g* leg of 3rd pair, × 22; 20*h* dactylus of this leg, × 44½; 20*i* propodus and dactylus of leg of 5th pair, × 44½; 20*j* left pleopod of 2nd somite, × 55½; 20*k* appendix masculina of this pleopod, × 111; 20*l* anterior part of carapace with the eyes of the egg-bearing female, long 16 mm., from Ralum, New Pommerania (Zool. Mus. Berlin), × 55½; 20*m* lateral view of the same, × 55½; 20*n* fingers of the right chela of the type, outer side, × 42.

Fig. 21—21*e*. *Calocaris (Calastacus) Sibogae* n. sp. Female without eggs from Stat. 139. 21 anterior part of carapace, rostrum, eyepeduncles and the peduncles of both pairs of antennae, × 11; 21*a* 3rd maxilliped, × 11; 21*b* podobranch of this maxilliped, × 27½; 21*c* inner border of coxa, basis and proximal half of ischium of this maxilliped, × 27½; 21*d* right cheliped, × 7 (the chela is placed somewhat obliquely, so that a greater part of the flattened lower border is visible than when it is placed in its usual position); 21*e* carpus and chela of 2nd leg, × 11.

20d

20f

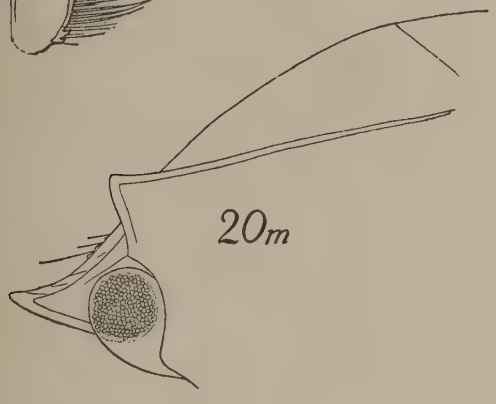
20i

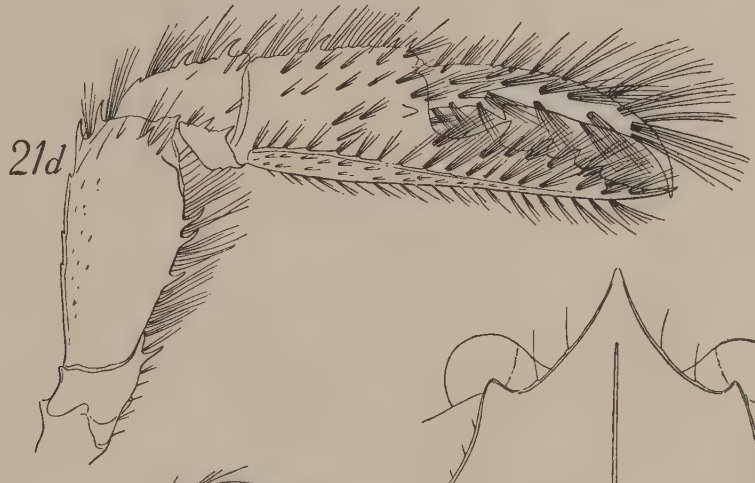
20h

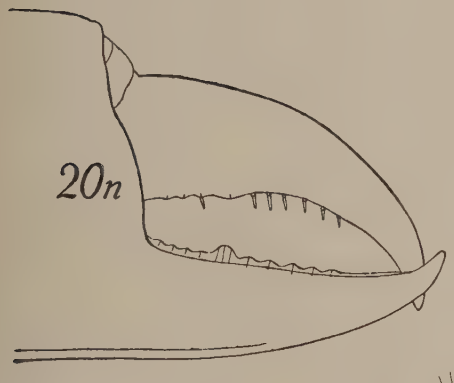
20e

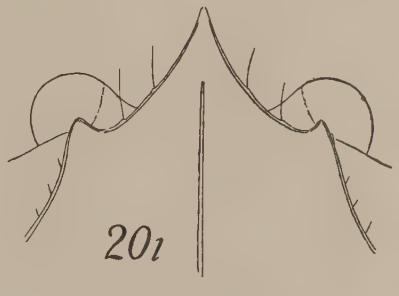
20k

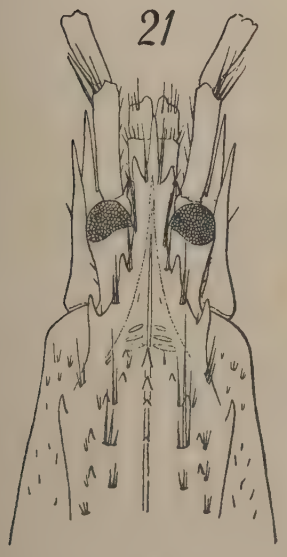
20g

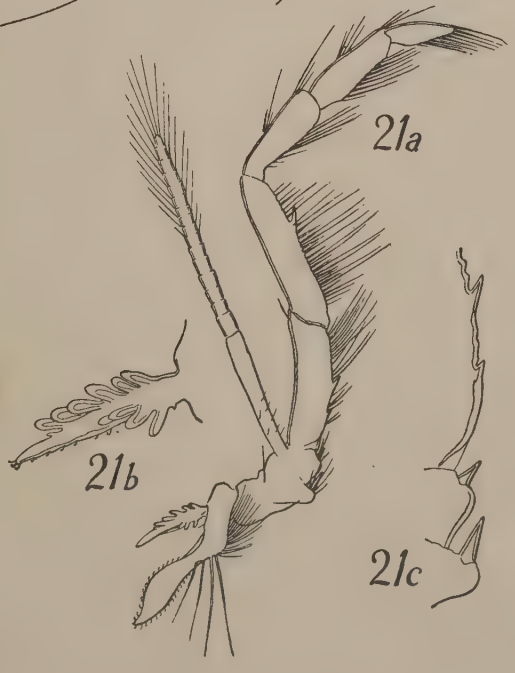

20m


21d

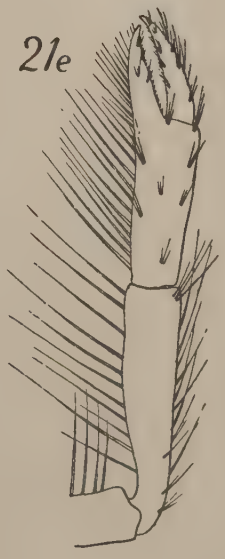

20n


20l


21


21a
21b
21c

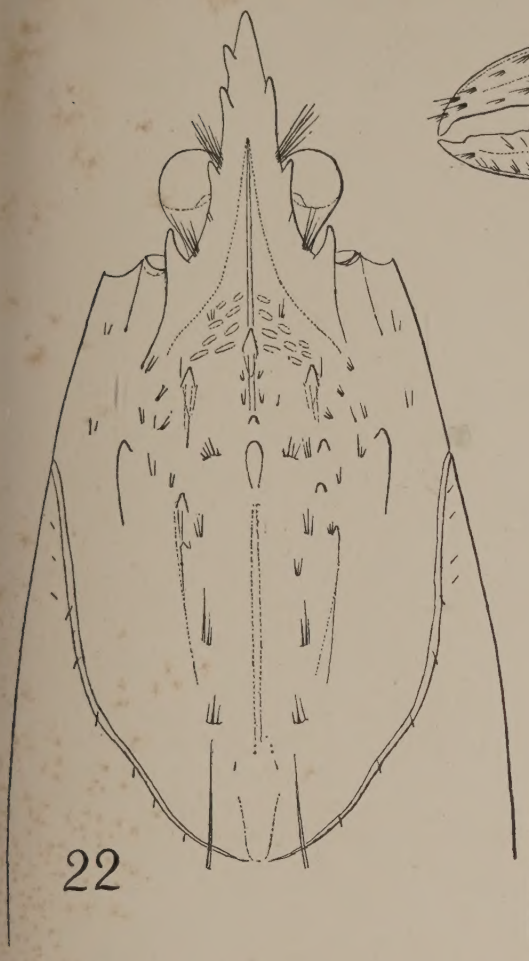
20j


21e

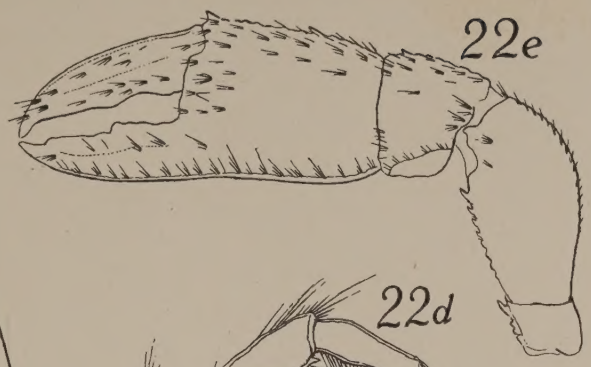
J. G. DE MAN, del.

PLATE X.

Fig. 22—22*g*. *Calocaris (Calastacus) euophthalma* (de Man). Male from Stat. 139. 22 anterior part of carapace, rostrum and eyepeduncles, × 23 1/2; 22*a* lateral view of the same, × 23 1/2 (a the anterior tooth of the median carina); 22*b* telson, × 33 1/2; 22*c* left uropods, × 33 1/2; 22*d* 3rd maxilliped, × 17; 22*e* left cheliped, × 8; 22*f* lower border of ischium and merus of this cheliped, × 33 1/2; 22*g* carpus and chela of 2nd legs, × 20.



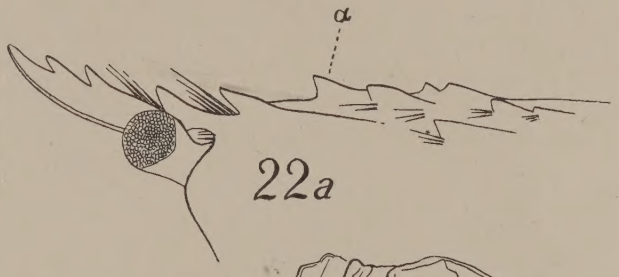
22



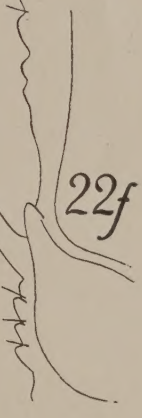
22e

22d

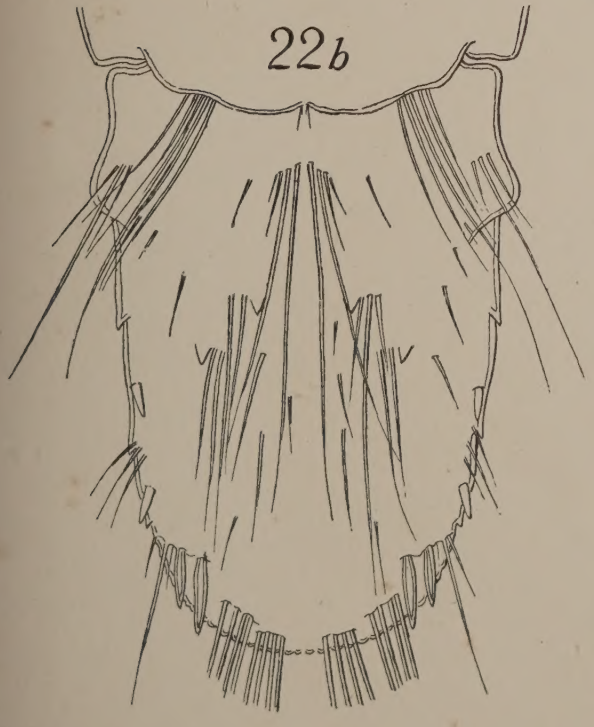
22g



22a



22f



22b

22c

J. G. DE MAN, del.